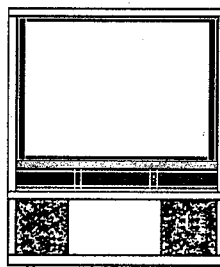


Service Manual



PIONEER®
The future of sound and vision.



PROJECTION MONITOR RECEIVER

SD-P4003

- This manual is applicable to the SD-P4003/S/G type.
- This manual is combined with operating instructions (from pages 123).

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IFO JULY. 1989 Printed in Japan

You must read the SAFETY PRECAUTIONS, the PRODUCT SAFETY NOTICE and the CHARGED SECTION, HIGH VOLTAGE GENERATING POINT AND X-RAY PROTECTION before servicing.

1. SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People who do not wear them should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, even though the SD-P4003, an isolation transformer should be inserted between power line and the set in safety before any service is performed.
3. When replacing a chassis in the set, all the protective devices must be put back in place, such as barriers, nonmetallic knobs, adjustment and compartment covershields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced set to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the set by the manufacturer has become defective, or inadvertently defeated during servicing.

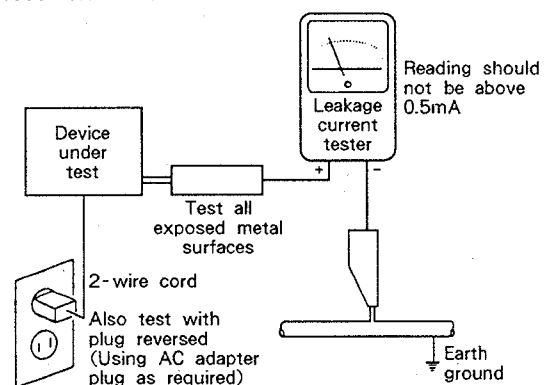
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC 500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (input/output terminals, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of $0.3M\Omega$ and a maximum resistor reading of $5M\Omega$. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (Do not use an isolation transformer for this check). Turn the AC power switch on. Using a "Leakage Current Tester (Simpson Model 229 equivalent)", measure for current from all exposed metal parts of the cabinet (input/output terminals, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed $0.5mA$.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE SET TO THE CUSTOMER.

High Voltage

This set is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.

SERVICEMAN WARNING

High voltage (31.8kV) will remain at anode of the picture tube for a long period after turning power off even more than one or two weeks.

In this state, it will be really dangerous if any kind of operation which has a risk of electric shock at anode is carried out; such as replacement of the picture tube (CRT assembly R, G, B) or exchanging and removing an anode cable.

When these kinds of operations are required, be sure to discharge anode voltage following the procedure of "Discharge of anode voltage", page 6.

X-ray radiation

TUBE: The primary source of X-ray radiation in this set is the picture tube.

For continued X-ray radiation protection, the replacement tube must be the same type as the original, PIONEER approved type.

The picture tube (CRT assembly R, G, B) used in this set holds complete guarantee against X-ray radiation when the X-ray is sealed (See on page 5). Accordingly, when the current is flowing to the picture tube (CRT assembly R, G, B), be sure to perform it by putting the tube into X-ray sealed applied state. Never supply the current to the picture tube (CRT assembly R, G, B) without having X-ray sealed. Moreover, when the voltage of the high voltage circuit becomes higher above the normal range, the picture tube radiates X-rays. Accordingly, when servicing the high voltage circuit, be sure to replace as an assembly with the DEFLECTION assembly (AWV1090) in the manner in which has been adjusted to perform normal operation.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in PIONEER sets have special safety related features and characteristics. These features often do not become evident upon visual inspection nor the protection afforded by them, necessarily, can be obtained by using replacement components rated even for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified with Δ and $\star$ marks on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create a risk of shock, fire, X-ray radiation, or other hazards. Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the most current PIONEER Service Manual. A subscription to, or additional copies of PIONEER Service Manuals may be obtained at a nominal fee from PIONEER.

3. CHARGED SECTION, HIGH VOLTAGE GENERATING POINT AND X-RAY PROTECTION

■ Charged section

The circuit in which the commercial AC power is used as it is without passing through the power supply transformer. If the charged section is touched, there is a risk of electric shock. In addition, the measuring equipment can be damaged if it is connected to the GND of the charged section and the GND of the non-charged section while connecting the set directly to the commercial AC power supply. In this case, be sure to connect the set via an insulated transformer and supply the current.

■ Charged section

(Power supply primary side)

- | | |
|--|---------|
| 1. The primary side of the DEFLECTION assembly | AWV1090 |
| 2. AC power cord | ADG1056 |
| 3. R1, R2 wire-wound resistor
(0.47/20W) | ACN1058 |
| 4. LINE FILTER assembly | AWT1005 |
| 5. Power transformer (T1) | ATS1166 |
| 6. Voltage selector (S1) | AKX-502 |

part is the charged section.

part is the high voltage generating points other than the charged section.

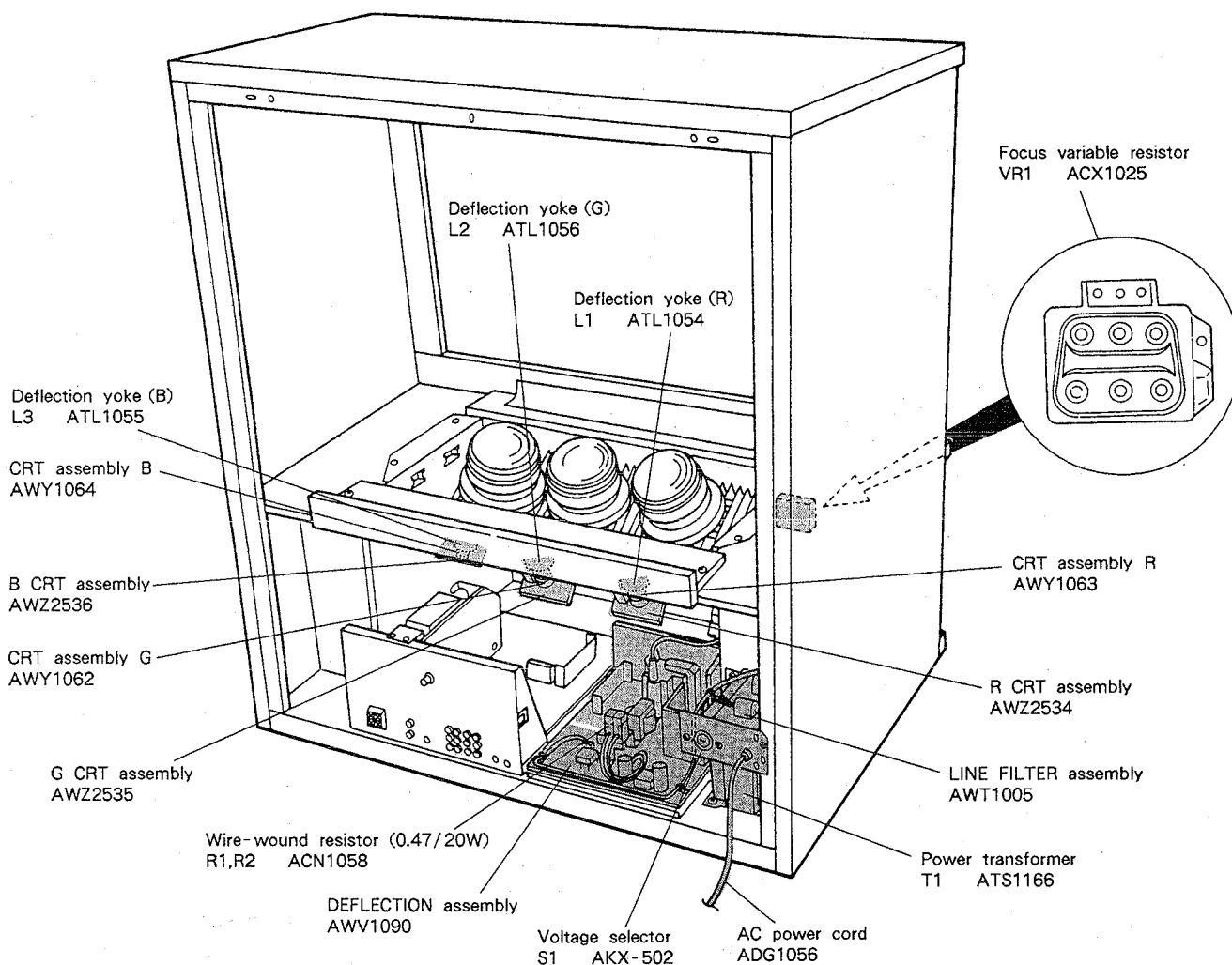


Fig. 3-1 Charged section and high voltage generating point

■ High voltage generating point

The place where voltage of over 100V is generated.

1. Charged section
2. DEFLECTION assembly
(including FBT)
 AWV1090 (31.5kV, 135V)
3. R CRT assembly
 AWZ2534 (10.5kV)
4. G CRT assembly
 AWZ2535 (10.5kV)
5. B CRT assembly
 AWZ2536 (10.5kV)
6. CRT assembly R
 AWY1063 (31.5kV)
7. CRT assembly G
 AWY1062 (31.5kV)
8. CRT assembly B
 AWY1064 (31.5kV)
9. Focus variable resistor (VR1)
 ACX1025 (10.5kV)
10. Deflection yoke
 ATL1054 (L1 : R)
 ATL1056 (L2 : G) (Approx.
 ATL1055 (L3 : B) 1200V at peak)

■ X-ray protection

● Regarding the parts which are relative to radiation of X-rays (There is the danger to radiate X-ray from the individual CRT assembly R, G, B), there are notifications of caution in the individual schematic diagrams. Be sure to read them for safety's sake.

● The component parts for X-ray protection are as follows : When the current flows to the CRT assembly R, G, B, be sure to perform it with these parts being attached. Protection from the X-ray radiation is maintained in the state in which these parts have been installed to the CRT assembly R, G, B. Accordingly, never supply current only to the CRT assembly R, G, B.

Moreover, the anode voltage of the CRT assembly R, G, B should always be kept not higher than the predetermined value (in the minimum brightness and picture state when non signal input is higher than 31.8kV). Be sure to drive the CRT assembly R, G, B by using a completely functional DEFLECTION assembly (AWV1090) which has been adjusted completely in the combined state. (When the voltage abnormally becomes high, the X-ray protection circuit will operate.)

1. CRT assembly R, G, B (Do not dismantle CRT assemblies under any circumstances).
2. Lens assembly 40 (GB), (R)

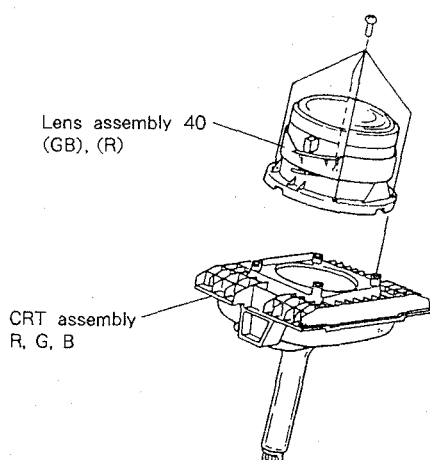


Fig. 3-2 Component parts for X-ray protection

4. DISCHARGE OF ANODE VOLTAGE

1. Turn off the POWER switch, and disconnect the AC power cord from the AC outlet for safety.
2. Disconnect the connector M2 in the R CRT assembly. (In order to protect power supply circuit for the heater.)
3. Apply the direct current (either + or -) of 6.3V and over 690mA between the HT + and HT - terminals in the B CRT assembly.
4. After more than 30 seconds have elapsed, short-circuit the TP-GK and GND terminals in the G CRT assembly. If the anode voltage has been left high, the center of the picture glows in circle, and goes off gradually. (Repeat steps 1 to 4, and the anode voltage of approx. 30 kV will drop to approx. 10 kV.)
5. Remove the anode cable from the flyback transformer (T553) as shown in Fig. 4-2. Be careful not to touch your hand or a part of your body to the tip of the anode cable.
6. Short-circuit the tip of the anode cable to the meshed wire portion of the CRT Assembly (or to the earth terminal screw to which the CRT Assembly is attached).
7. Connect the anode cable to the flyback transformer (T553) again for discharge the remain-high voltage in the flyback transformer.
8. Repeat steps 5 to 7 over three times, complete discharge of anode voltage.

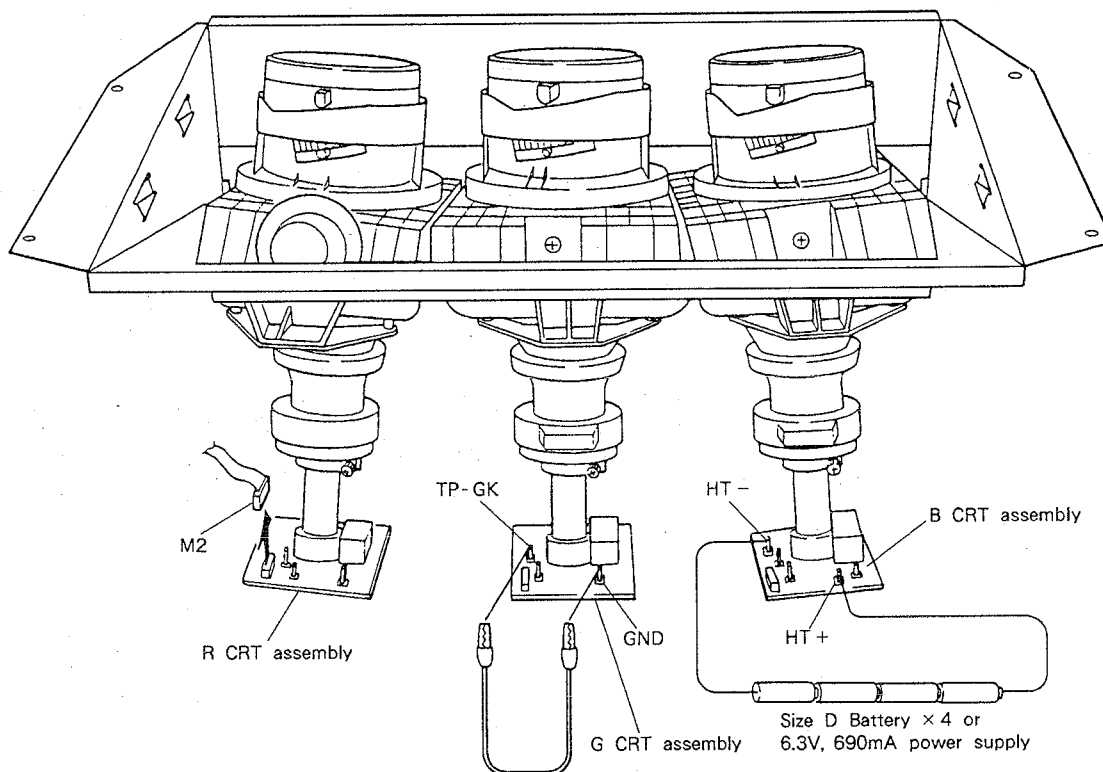


Fig. 4-1 Discharge of anode voltage (1)

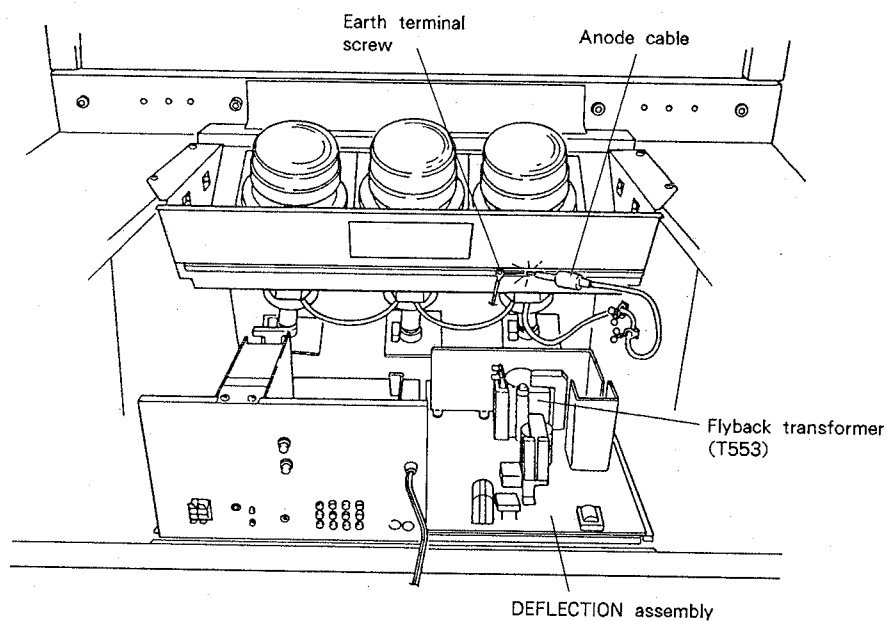


Fig. 4-2 Discharge of anode voltage (2)

5. DISASSEMBLY

• Removal of the side panel assembly

1. Remove the grille.
2. Insert your fingers into the holes ① and ②, or ③ and ④ (see Fig. 5-1) on the cabinet just under the side panel, and push the side panel forward.

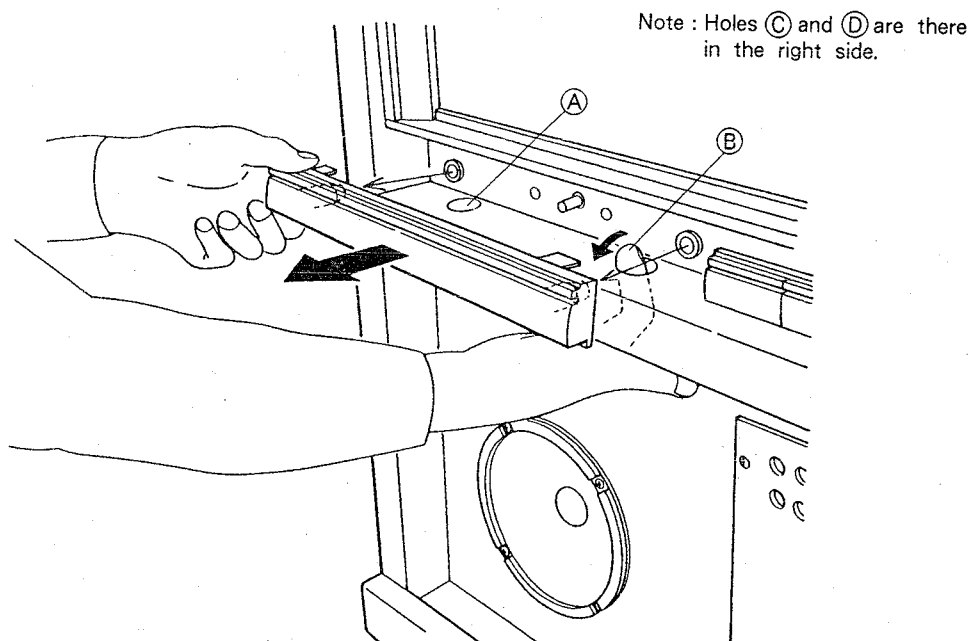


Fig. 5-1 Removal of the side panel assembly (Left side view)

6. EXPLODED VIEWS, PACKING AND PARTS LIST

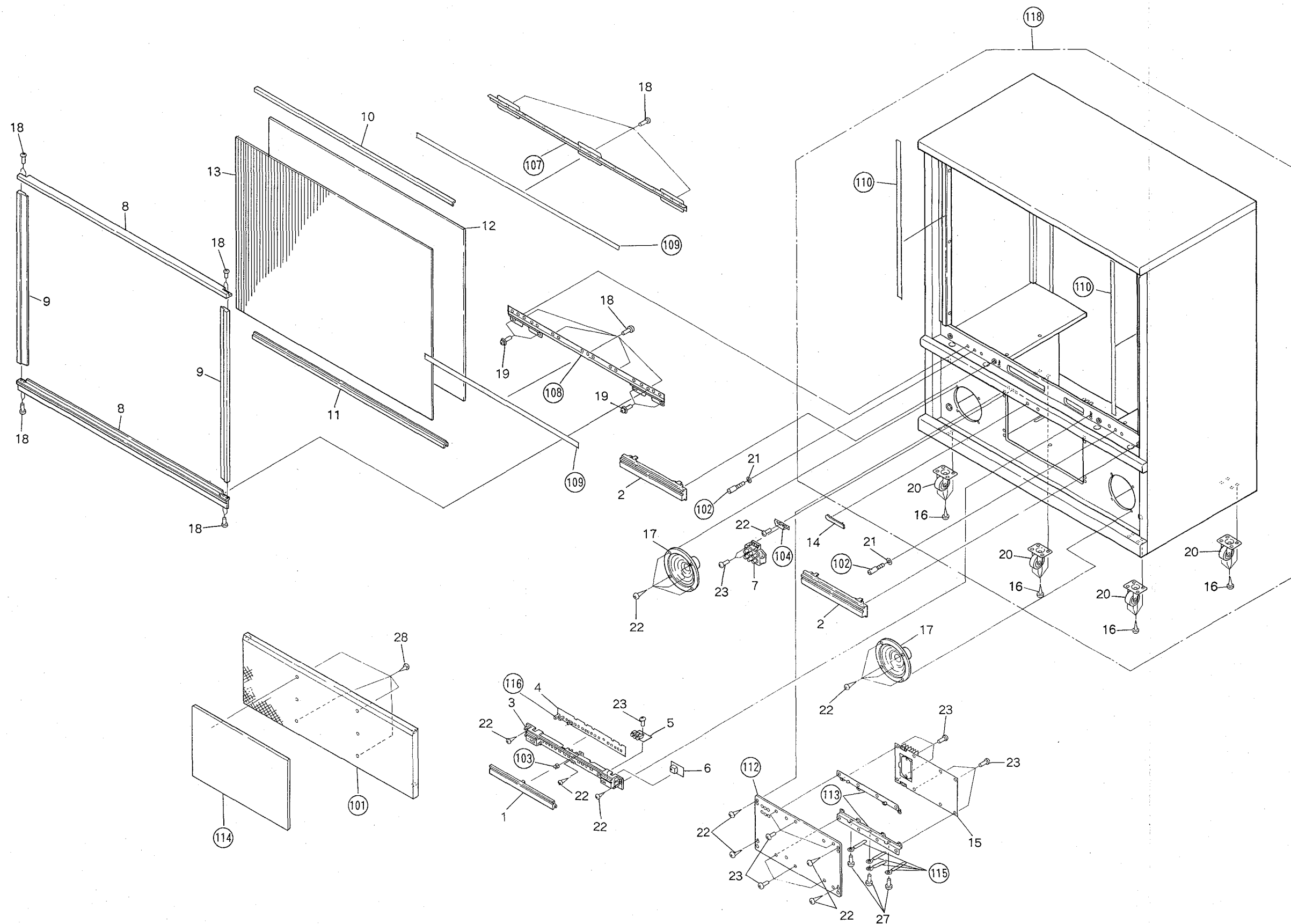
NOTES:

- Parts without part number cannot be supplied.
 - The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - Parts marked by "◎" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
 - Parts marked by ☆ are important parts which use X-rays.
- If any of these parts need to be replaced, always replace with specified parts.

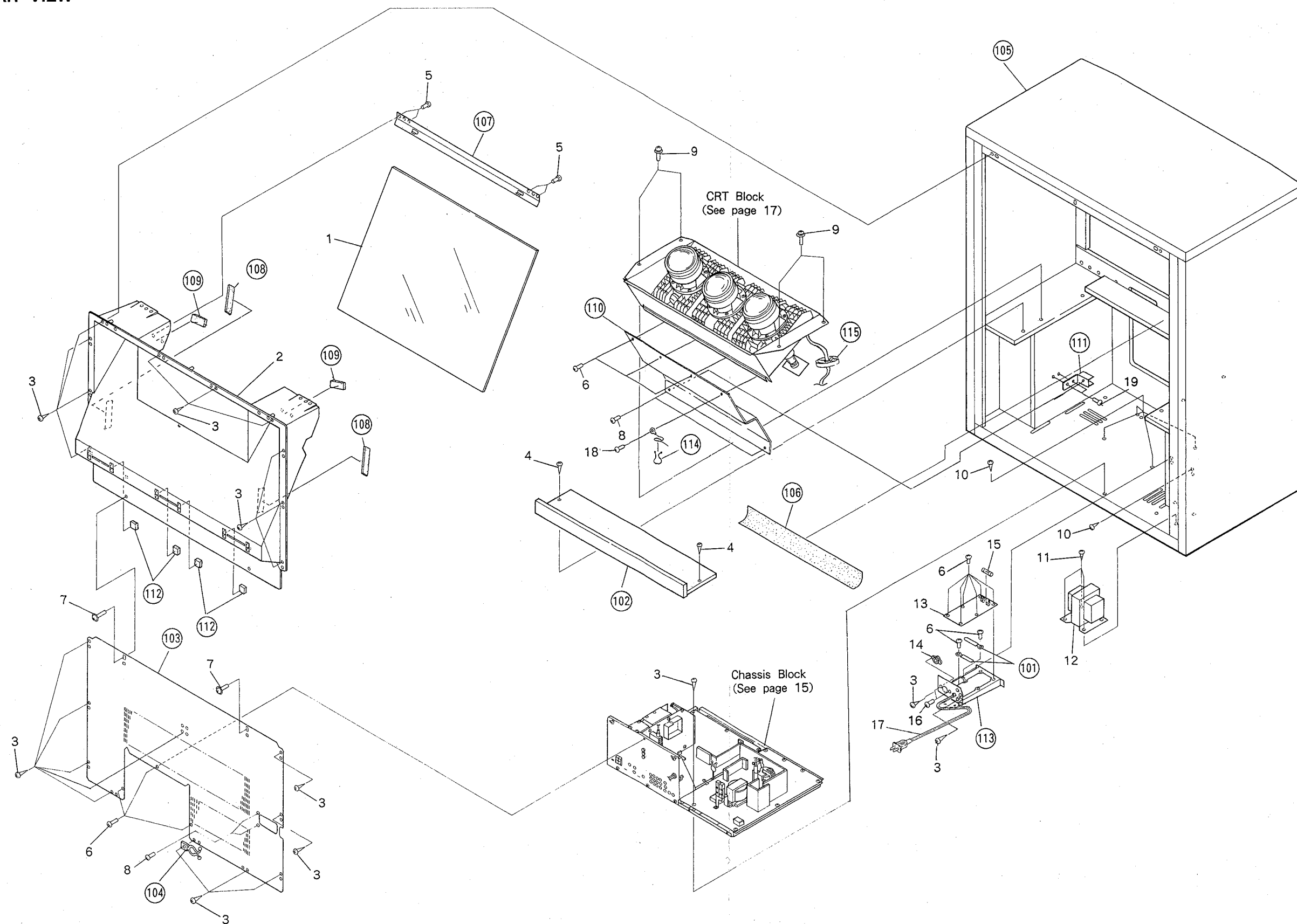
6.1 FRONT VIEW

Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AAN1150	Door assembly		101		SG grille
	2	AMB1500	Side panel assembly		102		Guide pin
	3	AMB1550	Front panel assembly		103		Catcher
	4	AWZ2539	FRONT CONTROL assembly		104		VR holder
	5	AWZ2542	FRONT INPUT TERMINAL assembly		105		
					106		
	6	AWZ2541	RECEIVER assembly		107		Holder A
Δ	7	ACX1025	Focus variable resistor (VR1)		108		Holder assembly
	8	AAP1091	Screen frame H		109		Spacer
	9	AAP1093	Screen frame V		110		Cushion
	10	AAP1057	Spacer H		111		
	11	AAP1070	Spacer L		112		Blind plate
	12	AMR2014	Fresnel		113		Stay
	13	AMR2015	Lenticular sheet		114		Grille ornamental plate
	14	AAM1008	Badge		115		Binder
	15	AWZ2626	CONVERGENCE assembly		116		LED holder
	16	BYC40P180FMC	Screw		117		
	17	APV1013	Speaker		118		Cabinet
	18	BYC40P200FMC	Screw				
	19	ABA1067	Screw				
	20	AMR1256	Caster				
	21	WA42F120K080	Washer				
	22	BYC35P160FZK	Screw				
	23	BBZ30P080FZK	Screw				
	24						
	25						
	26						
	27	VCZ30P060FMC	Screw				
	28	ANC30P300FMC	Screw				



6.2 REAR VIEW



Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AMR1427	Mirror		101		Binder
	2	AME1023	Mirror case		102		Shield plate
	3	BYC35P160FZK	Screw		103		Rear cover
	4	BYC40P250FMC	Screw		104		Cable clip
	5	ABA1069	Screw		105		Cabinet
	6	BBZ30P080FZK	Screw		106		Sheet
	7	ABA1005	Screw		107		Mirror holder
	8	ABA1085	Screw		108		Cushion sheet C
	9	PMB50P250FZB	Screw		109		Cushion sheet B
	10	ABA1038	Screw		110		Shield plate
	11	BYC40P160FMC	Screw		111		Holder
△	12	ATS1166	Power transformer (T1)		112		Cushion sheet A
	13	AWT1005	LINE FILTER assembly		113		SW holder
△	14	AKX-502	Line voltage selector (S1)		114		Purse lock S
△	15	AEK1002	Fuse (8A/125V, FU659)		115		Anode clamber
	16	MTZ30P100FZK	Screw				
△	17	ADG1056	AC power cord				
	18	VBT30P080FZK	Screw				
	19	BYC35P120FZK	Screw				

6.3 CHASSIS BLOCK

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AWE1136	TUNER assembly		101		Cord holder
	2	AEC-441	Rivet		102		Rear panel
	3	ANG1405	P. C. B angle		103		Cable clip
	4	ANG1373	P. C. B holder		104		Binder
	5	AWV1091	VIDEO assembly		105		Holder
	6						
	7						
	8	ANA1095	Chassis				
☆	9	AWV1090	DEFLECTION assembly				
	10						
	11						
△	12	AEK1018	Fuse (4A/125V, FU652,FU655,FU656,FU658)				
	13						
△	14	ACN1058	Wire wound resistor (R1,R2)				
	15	VBZ30P200FMC	Screw				
	16	BBZ30P080FZK	Screw				
	17	WAX0F160N100	Washer				
	18	ABN-087	Nut				
	19	ABA1089	Screw				
	20	ABA1088	Screw				
	21						
	22	ANH1213	Shield cover				

1

2

3

4

5

6

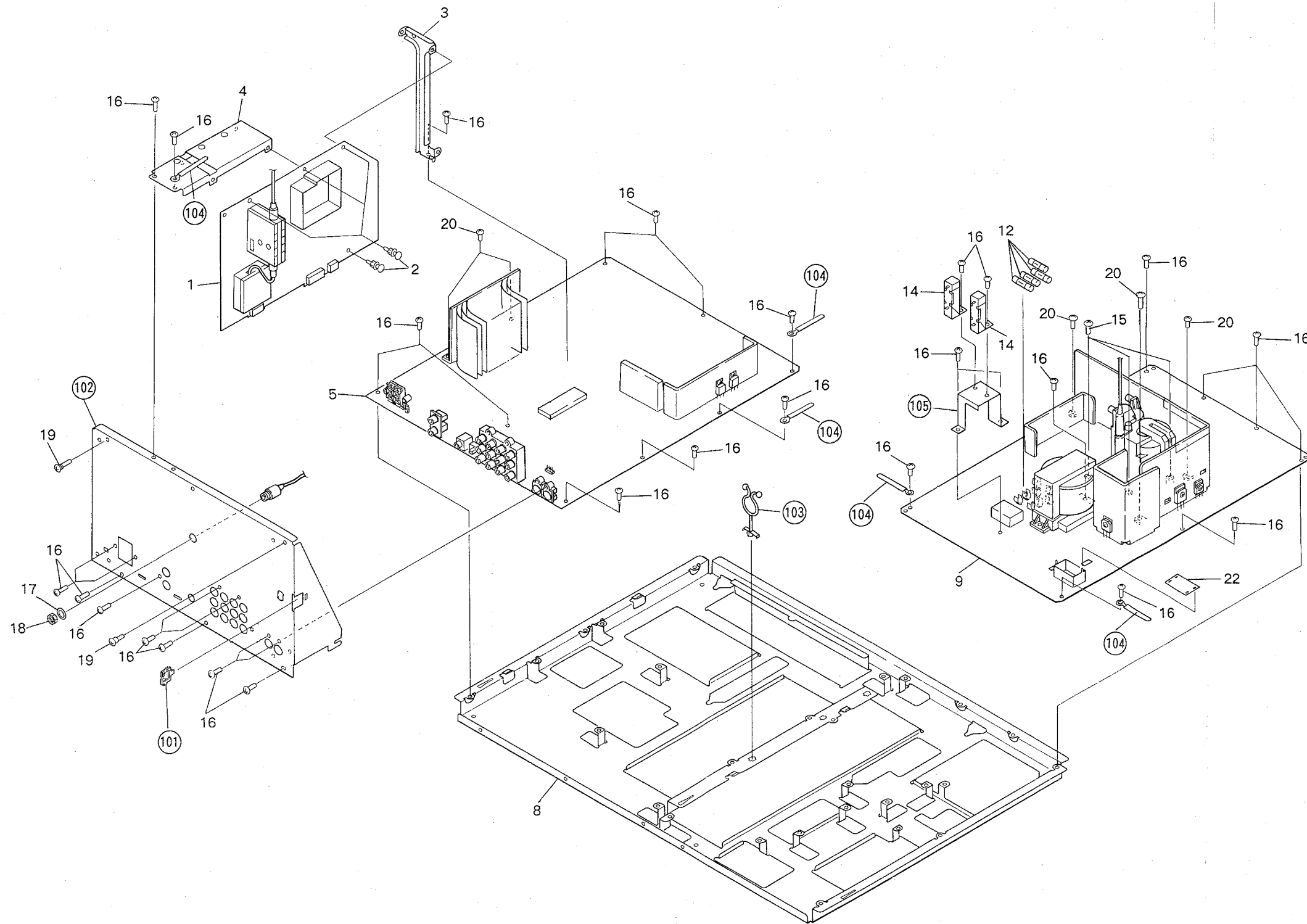
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A

B

C

D



A

B

C

D

1

2

3

4

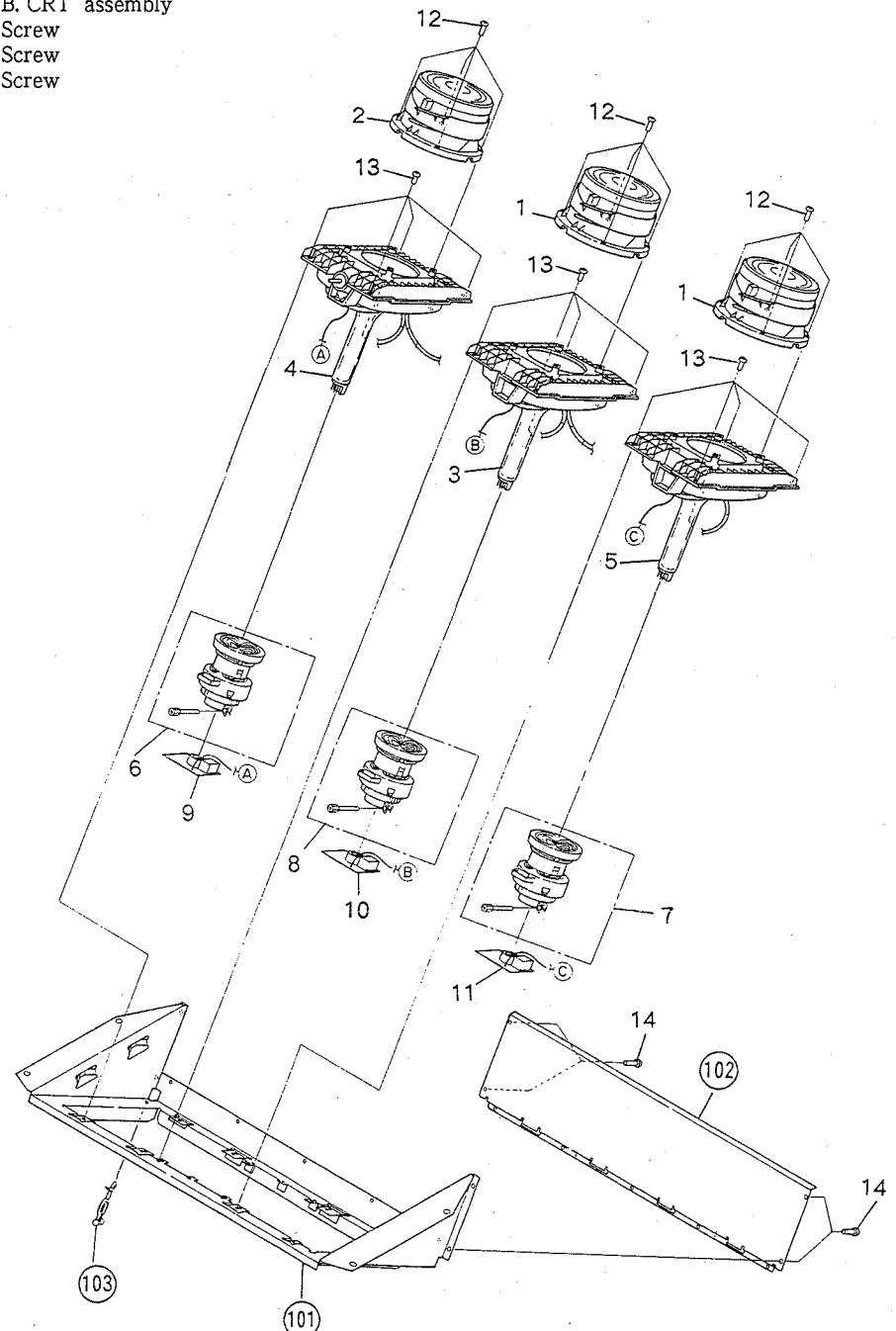
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6

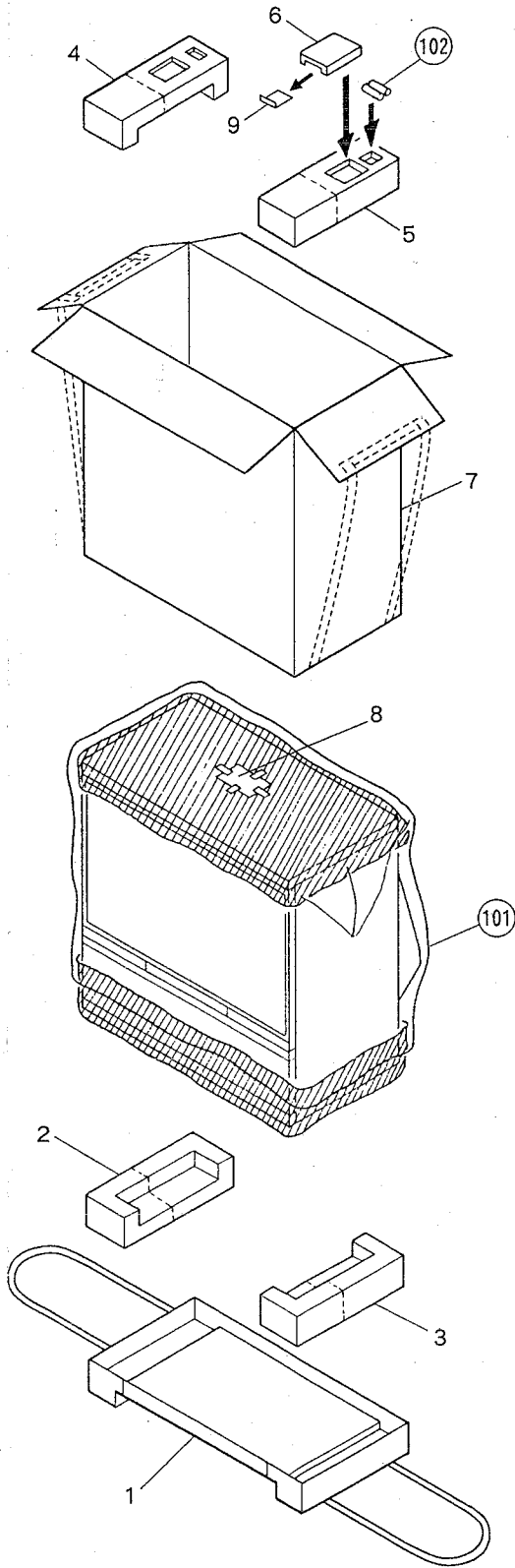
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6.4 CRT BLOCK

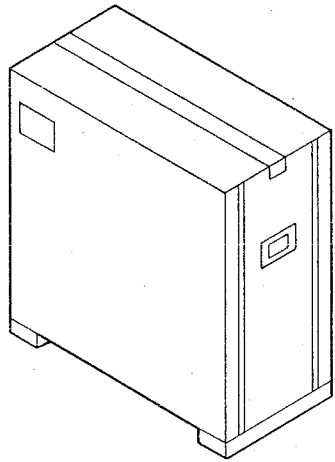
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
☆	1	AWL1024	Lens assembly 40 (GB)	101			CRT stand
☆	2	AWL1025	Lens assembly 40 (R)	102			Cover L
△☆	3	AWY1062	CRT assembly G	103			Lead clasper
△☆	4	AWY1063	CRT assembly R				
△☆	5	AWY1064	CRT assembly B				
△	6	ATL1054	Deflection yoke (R) (L1)				
△	7	ATL1055	Deflection yoke (B) (L3)				
△	8	ATL1056	Deflection yoke (G) (L2)				
	9	AWZ2534	R.CRT assembly				
	10	AWZ2535	G.CRT assembly				
	11	AWZ2536	B.CRT assembly				
	12	AMZ40P080FZK	Screw				
	13	FBT40P120FZK	Screw				
	14	BBZ30P080FZK	Screw				



6.5 PACKING



Mark	No.	Part No.	Description
	1	AHD1729	Under carton
	2	AHA1290	Under pad L
	3	AHA1291	Under pad R
	4	AHA1288	Upper pad L
	5	AHA1289	Upper pad R
	6	AXD1115	Remote control unit
	7	AHD1728	Upper carton
	8	ARB1210	Operating instructions (English)
	9	AZN1459	Battery cover
	101		Packing bag
	102		Battery



7. ELECTRICAL PARTS LIST

NOTES :

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5 %, and K = 10 %).

560 Ω → 56 × 10¹ → 561..... RD1/4PS 561J

47k Ω → 47 × 10³ → 473..... RD1/4PS 473J

0.5 Ω → 0R5 RN2H 0R5K

1 Ω → 010 RS1P 010K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10¹ → 5621 RN1/4SR 5621F

- Parts marked by ☆ are important parts which use X-rays. If any of these parts need to be replaced, always replace with specified parts.
- Parts marked by × are important parts which use X-rays. If a failure occurs in any of these parts, replace the printed circuit board assembly where the relevant part has already been adjusted as a working component. Do not replace the actual part itself. If any part marked by × is replaced, there is danger of being exposed to X-rays.

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	RECEIVER assembly	AWZ2541
	LINE FILTER assembly	AWT1005
	VIDEO assembly	AWV1091
	FRONT INPUT TERMINAL assembly	AWZ2542
☆	DEFLECTION assembly	AWV1090
	FRONT CONTROL assembly	AWZ2539
	TUNER assembly	AWE1136
	CONVERGENCE assembly	AWZ2626
	R CRT assembly	AWZ2534
	G CRT assembly	AWZ2535
	B CRT assembly	AWZ2536

OTHERS

Mark	Symbol & Description	Part No.
Δ	R1,R2 Wire-wound resistor (0.47Ω/20W)	ACN1058
Δ	VR1 Focus variable resistor	ACX1025
Δ	L1 Deflection yoke (R)	ATL1054
Δ	L2 Deflection yoke (G)	ATL1056
Δ	L3 Deflection yoke (B)	ATL1055
Δ	FU659 Fuse (8A/125V)	AEK1002
Δ	FU652,FU655,FU656,FU658 Fuse (4A/125V)	AEK1018
Δ	S1 Voltage selector	AKX-502
	Speaker (Full range)	APV1013
Δ	AC power cord	ADG1056
Δ	J1 Anode cable	ADY1011
Δ☆	CRT assembly G	AWY1062
Δ☆	CRT assembly R	AWY1063
Δ☆	CRT assembly B	AWY1064
Δ	T1 Power transformer	ATS1166
	Remote control unit	AXD1115

RECEIVER Assembly (AWZ2541)

CAPACITORS

Mark	Symbol & Description	Part No.
	C962	CCDSL121J50
	C961	CEJA101M6

RESISTOR

Mark	Symbol & Description	Part No.
	R551	RD1/8PM102J

OTHERS

Mark	Symbol & Description	Part No.
	Remote control sensor unit	AXX1010

LINE FILTER Assembly (AWT1005)

COILS

Mark	Symbol & Description	Part No.
	L699,L670 Line filter	ATF1031

CAPACITORS

Mark	Symbol & Description	Part No.
	C788 - C790 (0.1μ/AC250V)	ACE-507

RESISTOR

Mark	Symbol & Description	Part No.
	R350 Solid (2.2M/1/2W)	ACN-208

VIDEO Assembly (AWV1091)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
TH601	TH101-2	
IC401	PA0040	
IC103	AN5302K	
IC102	PA0030	
IC101	TC4066BP	
IC206	UPC78M05H	
IC205	M6M80011AP	
IC203	PDG040	
IC201,IC202	TC4051BP	
IC204	UPD6145C-001	
IC601	NJM78M09A	
IC451	TA7630P	
IC452	TA8200AH	
Q248,Q408,Q413,Q414	RN1203	
Q102 - Q104,Q109,Q110,Q116, Q117,Q128,Q129,Q132,Q134, Q137 - Q141,Q145,Q147,Q148, Q150,Q154,Q156,Q157,Q162,Q167, Q168,Q171,Q172,Q201,Q203,Q204, Q206,Q207,Q209,Q211,Q213,Q215, Q217,Q219,Q222,Q225,Q226,Q228, Q230,Q242,Q246,Q247,Q401,Q407, Q455,Q604,Q609	2SA933S	
Q105 - Q108,Q113 - Q115, Q118 - Q122,Q127,Q133,Q135, Q136,Q144,Q146,Q149,Q152,Q160, Q161,Q163 - Q165,Q202,Q205, Q208,Q210,Q212,Q214,Q216,Q218, Q220,Q221,Q223,Q224,Q227,Q229, Q231 - Q241,Q243,Q245,Q405, Q406,Q451,Q452,Q456, Q605 - Q608	2SC1740S	
Q453,Q454,Q457,Q458	2SC3327	
Q125,Q126,Q130,Q131,Q142,Q143, Q166	2SK246	
Q244	2SD438	
Q601	2SB950A	
Q603	2SC1845	
Q602	2SD1276A	
D112,D220	RD5.1ESB1	
D905	HZS5BLL	
D451 - D454	RD6.8ESB2	
D106	1SS108	
D101 - D103,D109 - D111,D115, D116,D125 - D133,D201 - D213, D215,D221 - D224,D227 - D234, D455 - D462,D601 - D608,D610, D611,D613,D614,D901 - D903	1SS252	
D107,D108,D113,D114,D121,D122 D463	OA90A-M 11E2	

SWITCH

Mark	Symbol & Description	Part No.
S451	Slide switch (SPEAKER SELECTOR)	ASH1001

COILS

Mark	Symbol & Description	Part No.
L150	Tuning coil	ATG1006
L105,L106		LAU1R8M
L114,L201,L203		LAU100K
L101,L108,L110,L151		LAU150K
L103,L104		LAU3R9K
L111,L112,L115		LAU4R7K
L107		LAU680K
L109		LAU820K
L202		LAU470K
L451,L452	AF choke coil (1 μ H)	ATH-133

CAPACITORS

Mark	Symbol & Description	Part No.
TC201	Ceramic trimmer (5.2 - 30p)	ACM-017
C695	(0.82 μ / 50V)	ACH-388
C681	(2.2 μ / 16V)	ACH1131
C143		CCCCH100D50
C244		CCCCH330J50
C692		CCDCH221J50
C110		CCCSL100D50
C159,C178,C239,C685,C700,C791		CCCSL101J50
C112,C149		CCCSL121J50
C121,C122		CCCSL271J50
C102		CCCSL150J50
C131,C146,C163,C175,C183		CCCSL151J50
C190		CCCSL220J50
C179		CCCSL221J50
C111,C132,C795		CCCSL390J50
C287		CCDSL270J50
C144,C161,C172,C185		CCCSL470J50
C114,C240		CCCSL680J50
C241		CCDSL560J50
C797		CCDSL181J50
C145,C162,C173,C683		CEANP010M50
C168		CEANP100M16
C167		CEANP3R3M50
C479		CEANPR22M50
C268,C697		CEANP2R2M50
C793		CEANP4R7M35
C455		CEANP220M10
C141		CEASR47M50
C106,C138,C156 - C158,C166, C258,C459 - C468,C480,C517, C518,C523,C532,C699		CEAS010M50
C101,C104,C108,C135,C139,C152, C164,C165,C169,C174,C215,C217, C245,C247,C253,C266,C477,C696, C794		CEAS100M50
C126,C488		CEAS101M16

Mark	Symbol & Description	Part No.
	C170 C147,C186 C151,C153 C109,C123,C124,C176,C481 C103	CEAS220M16 CEAS221M16 CEAS3R3M50 CEAS330M16 CEAS4R7M50
	C113,C127 - C129,C133,C698 C171 C107,C118,C119 C160 C130	CEAS470M16 CKCYB331K50 CKCYB391K50 CKCYB561K50 CKCYF102Z50
	C116,C117,C120,C125,C134,C155 C140,C142,C154 C230,C684 C211 C249,C250,C673	CKDYF103Z50 CKCYX473M25 CEASR33M50 CEAS0R1M50 CEAS101M10
	C221,C226,C233,C265,C507,C508 C238 C242,C689 C213,C216,C219,C220, C222 - C225,C228,C229,C231, C232	CEAS330M25 CEAS470M25 CEAS471M10 CEJA2R2M50
	C214,C263,C264 C234 C218,C227,C235,C243,C246,C248, C252,C261,C458,C472,C474,C478, C483 - C485,C487,C525,C680, C800	CKCYB102K50 CKCYB472K50 CKDYF103Z50
	C212,C236,C237,C251,C262,C511, C526,C533,C674 - C677,C688, C690 C456 C469,C470,C505,C506,C687	CKDYF473Z50 CEAS102M10 CEAS2R2M50
	C486,C502 C451 - C454,C471,C473 C515,C516 C497 - C501,C524 C509,C510	CEAS222M16 CEJA220M10 CEAS222M35 CEAS470M10 CEAS470M50
	C512 C495,C496,C513,C514 C491,C492 C493,C494 C503,C504	CEAS471M50 CFTXA124J50 CFTXA154J50 CKCYB562K50 CKMYB561K50
	C672 C693,C694 C671 C792 C682	CEAS102M16 CEAS222M25 CEHAQ471M50 CKCYB561K50 CQMA123J50
	C678 C691 C686 C798 C679	CQMA182J50 CQMA223J50 CQMA333J50 CQMA473J50 CQMA683J50
	C530,C531 C799	CEHAQ2R2M50 CEAS220M50

RESISTORS

Mark	Symbol & Description	Part No.
	VR102 Semi-fixed (220 Ω) VR101 Semi-fixed (1k Ω) VR107 Semi-fixed (2.2k Ω) VR105,VR601 Semi-fixed (100 Ω)	ACP1021 ACP1022 ACP1023 ACP1031
Δ	R242,R271,R312,R673,R674 R514,R696,R697 R617 Resistor array	RD1/2PM□□□J RD1/4PMFL100J RA4T103J RS2LMF220J RS1LMF010J
Δ	R614 R417,R418	
Δ	R401,R402,R423 R951,R952 R694,R695 R949,R950 Other resistors	RS2LMF□□□J RD1/4PMFL2R2J RD1/4PMFL220J RD1/4PMFL□□□J RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	X101 Crystal resonator (3.579545MHz)	ASS-028
	DL101 Glass delay line DL102,DL104 Delay line DL103 Delay line	ATN1011 ATN1013 ATN1014
	X201 Ceramic resonator (4.19MHz)	ASS1022
	X601 Ceramic resonator 12P Pin jack 4P Mini DIN socket	ASS1033 AKB1094 AKP1016
	Mini jack 2P Pin jack 4P Terminal (SPEAKER)	AKN-207 AKB1039 AKE1014

FRONT INPUT TERMINAL Assembly
(AWZ2542)

RESISTORS

Mark	Symbol & Description	Part No.
	R541 - R543	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	1P Pin jack 1P Pin jack 1P Pin jack	AKB-104 AKB-105 AKB-106

☆ DEFLECTION Assembly (AWV1090)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC651	ON3161-Q
	IC551	NJM4558DXP
△	IC552	NJM4558DXP
×	Q592	
	Q554, Q589, Q656 - Q660, Q664, Q665	2SA933S
×	Q590	
×	Q586, Q587	
	Q597	2SA965
	Q551 - Q553, Q555, Q556, Q599, Q600, Q653 - Q655, Q661, Q667	2SC1740S
	Q598	2SC2235
	Q557, Q596	2SC2705
×	Q591, Q593	
	Q559, Q588	2SC3332
	Q558, Q595	2SD1276A
	Q560	2SD1911
△	Q594	2SD1911
	Q652	2SB824
	Q662	2SC2705
	Q651	2SC3451
	Q663, Q666	2SD1275
	D573	ES1F
△	D598, D599	ES1F
	D557	HZS6C1L
×	D580, D582	
	D578	RD39ESB
×	D584	
×	D592	
×	D597	
	D589, D590	UZ-15BS
	D672	HZS18-1L
	D668	HZS6A1L
	D662, D663, D671, D673	HZS6B1L
	D665	HZS6C2L
	D651	RB604
	D680	RD39ESB4
	D679	RG4A
	D666, D674 - D678	RL4Z
	D660	S1YB10
×	D581, D583	
	D551, D553 - D556, D574 - D577, D579, D585 - D588, D591, D593 - D596, D655 - D658, D661, D664, D681 - D686	1SS252
	D552	11E2
△	D558	11E2
	D653, D654, D659	11DF1FD
△	D600	11DF2FD

RELAY

Mark	Symbol & Description	Part No.
	RY651 Relay	ASR-512

COILS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	L551 FBT coil	ATL1053
	L552 FBT coil	ATL1057
	L553 Linearity coil	ATL1058
	L654, L656, L658, L679 Ferrite bead	ATX-028
	L652 Line filter	ATF-207
	L655 AF choke coil (1μH)	ATH-133
	L653 AF choke coil (53μH)	ATH1009
	L556	LTA272J
△×	T553 Flyback transformer	
△	T551, T552 Horiz. drive transformer	ATK1045
	T652 Converter transformer	ATK1044
	T651 Power transformer	ATT1099

CAPACITORS

Mark	Symbol & Description	Part No.
	C625 (0.82μ/200V)	ACE1044
	C620 (680p/2kV)	ACG1024
△	C666 (680p/2kV)	ACG1024
	C670 (10μ/160V)	ACH-369
△	C619 (1μ/160V)	ACH-372
△	C668 (10μ/160V)	ACH1117
	C616 (330μ/200V)	ACH1079
	C722 - C725 (6800p/AC250V)	ACE1009
	C703 - C706 (0.01μ/AC250V)	ACG-001
	C714 (2200p/2kV)	ACG-039
	C760 (100p/2kV)	ACG-032
	C712 (4700p/2kV)	ACG1028
	C715 (2.2μ/350V)	ACH-371
	C759 (560μ/160V)	ACH1016
	C747 (3300μ/50V)	ACH1041
	C707 (560μ/200V)	ACH1042
	C709 (1000μ/200V)	ACH1050
	C717 (47μ/100V)	ACH1132
	C657, C669	CCCSL101J50
	C624	CCCSL181J50
	C708	CCCSL151J50
	C718, C749, C751, C752, C755, C756, C758	CCDSL221K500
	C645	CEAS0R1M50
	C608 - C610, C640, C643, C647, C648, C655, C656, C659, C733, C744, C763	CEAS010M50
	C607, C612, C741, C743, C745, C765	CEAS100M50
	C653, C654	CEAS101M35
	C665	CEAS220M100
	C641	CEAS221M35
	C642, C646	CEAS470M16
	C732, C764	CEAS101M16
	C726	CEAS102M25
	C746	CEAS221M16
	C739	CEAS331M35
	C729 - C731	CEAS470M25

Mark	Symbol & Description	Part No.
	C617,C663	CEHAQ010M50
	C664	CEHAQ100M50
	C660	CEHAQ220M25
	C754	CEHAQ102M50
	C735,C748,C753	CEHAQ222M35
	C757	CEHAQ222M50
	C623	CFPA103H1200
	C622,C667	CFPA123H1200
	C716	CFTXA224J50
	C721	CFTXA474J50
	C644	CKCYB102K50
	C615,C618	CKCYB102K500
	C742	CKCYB681K50
	C639,C649 - C652,C727,C728, C734	CKCYF103Z50
	C736,C738	CKCYF473Z50
	C740	CKCYX473M25
	C611	CKDYB222K50
	C662	CKDYB472K500
	C601,C603,C613	CKDYF473Z50
	C761,C762	CKDYF103Z500
	C602	CKDYX104M25
	C605	CQMA103K400
	C604	CQMA123K50
	C658	CQMA104K50
	C606	CQMA223K50
	C661	CQMA683K400
	C719	CQMA822J50
	C621	CQPA683J400

RESISTORS

Mark	Symbol & Description	Part No.
×	VR553 Semi-fixed	
×	VR555 Semi-fixed	
×	VR554 Semi-fixed	
×	VR552 Semi-fixed	
	VR651 Semi-fixed (1k Ω)	VRTS6VS102
	VR551 Semi-fixed (2.2k Ω)	ACP1023
	R180 Solid (47/1/2W)	ACN-225
△	R143 Solid (33k/1/2W)	ACN1011
	R279 Solid (2.2M/1/2W)	ACN-208
	R252,R264 (2.7 Ω /5W)	ACN1060
	R254 Wire-wound (15/10W)	ACN1056
	R256,R257 Wire-wound (18/10W)	ACN1057
△	R139	RD1/2PMFL102J
△	R142	RD1/2PMFL3R9J
	R108	RD1/2PMFL100J
	R133,R134,R141,R185,R224,R225, R228,R255,R261,R263,R313,R318	RD1/2PM□□□J
△	R183,R238	RD1/4PMFL100J
△	R186,R187	RD1/4PMFL390J
	R184,R243,R258	RD1/4PMFL□□□J
	R244	RD1/4PM124J
	R229,R230	RN1/2PC□□□□F
	R291,R295 - R297,R310,R311 R199,R200,R253,R312	RN1/4PC□□□□F RS1LMF□□□J

Mark	Symbol & Description	Part No.
	R241,R259,R288,R293,R317 R246,R265,R316 R247 R140,R144,R231	RS2LMF□□□J RS3LMF□□□J RFA1/4PS221J RS2PMF□□□J
△×	R234	
×	R232	
×	R233	
×	R240	
×	R226	
×	R213	
×	R188,R196,R197,R211	
×	R210	
×	R209	
×	R208	
×	R239	
×	R194	
×	R195	
×	R198	
×	R203	
×	R204	
×	R205	
×	R206	
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Mica sheet (For Q651)	AEP-056

FRONT CONTROL Assembly (AWZ2539)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	PC861 CdS	SC-05-8S
	Q861	2SC1740S
	D861	AEL-459

SWITCHES

Mark	Symbol & Description	Part No.
	S861 - S875 Tact switch (POWER, FACTORY ADJ MODE, INPUT SELECTOR, CHANNEL (+, -), VOLUME(+, -), STD/ AV MEM, DPO, PRESET MENU (ON/OFF, SELECT, SET)	ASG-703

CAPACITOR

Mark	Symbol & Description	Part No.
	C951	CEJA470M10

RESISTORS

Mark	Symbol & Description	Part No.
	VR861 Semi-fixed (47k Ω)	VRTS6VS473
	R531 - R535	RD1/8PM□□□J

TUNER Assembly (AWE1136)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC304	CXA1124AS
	IC301	M51365SP
	IC302	M5223P
	IC305	NJM78M09A
	IC303	TD6359P
	Q321	RN1201
	Q320	RN1203
	Q319	RN2203
	Q301 - Q304, Q307, Q312, Q315,	2SA933S
	Q308 - Q311, Q313, Q314, Q318,	2SC1740S
	Q322 - Q324, Q327	
	Q317	2SC1740SLN
	Q305, Q306	2SC2786
	Q316	2SC2878
	D304	RD30ESB2
	D301, D302, D305 - D309	1SS252

COILS AND FILTERS

Mark	Symbol & Description	Part No.
	L302, L303, L309 Tuning coil	ATC-226
	L310 Tuning coil	ATC-249
	L306 Tuning coil	ATC-254
	L312 FM detector coil	ATE-067
	L301	LAUR33M
	L304	LAUR47M
	L305	LAU1R2M
	L308	LAU150K
	L311, L313 - L316	LAU2R2M
	F303 Ceramic trap	ATF-114
	F304 Ceramic filter	ATF-166
	F301 SAW filter	ATF1019
	F302 SAW filter	ATF1046

CAPACITORS

Mark	Symbol & Description	Part No.
	C402 (3.3 μ /50V)	ACH1128
	C400 (10 μ /50V)	ACH1129
	C350	CCDRH270J50
	C334, C348	CCDRH560J50
	C338	CCDSH470J50
	C347	CCDSL820J50
	C337, C339	CCMCH040C50
	C335, C336, C354	CCMCH050C50
	C417	CCMCH150J50
	C385, C386	CCMCH270J50
	C379, C381 - C384	CCMSL101J50
	C396	CEANPR22M50
	C361, C407	CEASR47M50
	C353, C401	CEAS010M50
	C364	CEAS100M50

Mark	Symbol & Description	Part No.
	C376, C377, C388, C422	CEAS101M10
	C341	CEAS101M16
	C331	CEAS102M16
	C345, C349, C408, C409	CEAS2R2M50
	C375, C415	CEAS331M16
	C342, C392, C395, C399, C403, C404,	CEAS4R7M50
	C406, C412	
	C351, C366, C373, C397, C414	CEAS470M16
	C405	CFTXA473J50
	C413, C416	CKCYX104M25
	C367, C374	CKCYX473M25
	C333, C340, C343, C362, C365, C368,	CKDYB102K50
	C370, C371, C378, C380, C419	
	C346	CKDYB122K50
	C332, C352, C355, C356, C359, C360,	CKDYF103Z50
	C363, C372, C387, C391, C418, C420,	
	C421	
	C344	CQMA103J50
	C357, C358	CQMA104J50
	C394	CQMA123J50
	C389	CQMA154J50
	C410, C411	CQMA222J50
	C398	CQMA272J50
	C390	CQMA333J50
	C393	CQMA562K50
	C369	CQMA563J50

RESISTORS

Mark	Symbol & Description	Part No.
	VR301, VR302, VR306	ACP1024
	Semi-fixed (4.7k Ω)	
	VR305 Semi-fixed (10k Ω)	ACP1025
	VR303, VR304	ACP1027
	Semi-fixed (47k Ω)	
	R1242, R1244	RD1/2PMFL□□□J
	R1245	RD1/4PMFL8R2J
	R1243	RD1/4PM221J
	R1213, R1217, R1218, R1220, R1221	RN1/4PC□□□□F
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	X301 Crystal resonator (4.0MHz)	ASS-013
	TV Front end	AXF1033

CONVERGENCE Assembly (AWZ2626)**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	IC704 - IC706	M5220L
	IC703	NJM79L15A
	IC701	PA0036
	IC751	STK4277-SL
	IC702	UPC78L12J
	Q751	2SB951A
	Q701 - Q705, Q755	2SC1740S
	Q753, Q754	2SC2235
	Q752	2SD1277A
	D705, D708	RD5.1ESB
	D701	RD8.2ESB
	D702 - D704, D706, D707	1SS252
	D751, D752	11E2

CAPACITORS

Mark	Symbol & Description	Part No.
	C829, C830, C835, C836, C841, C842	CCMSL470J50
	C845, C846, C851, C852	
	C822	CEANP010M50
	C801, C804	CEASR33M50
	C802, C805, C807	CEAS010M50
	C810, C823 - C826	CEAS100M50
	C855	CEAS101M16
	C856	CEAS101M25
	C813, C815	CEAS102M6
	C819, C821	CEAS2R2M50
	C827, C828, C833, C834, C839, C840,	CEAS221M10
	C843, C844, C849, C850	
	C886, C888 - C890	CEHAQ101M50
	C882, C884	CEHAQ221M35
	C891	CEHAQ330M50
	C803, C806, C812, C814, C831, C832,	CGMYX103M16
	C837, C838, C847, C848	
	C881, C883, C885, C887	CKCYF103Z50
	C809	CQMA154J50
	C811, C816	CQMA224J50
	C817	CQMA332J50
	C820	CQMA471J50
	C818	CQMA681J50
	C808	CQMA821J50
	C854	CQSA102J50
	C853	CQSA152J50

RESISTORS

Mark	Symbol & Description	Part No.
	VR701 Semi-fixed (10k Ω)	ACP1025
	VR705 - VR707, VR709 - VR740	ACP1024
	Semi-fixed (4.7k Ω)	
	VR708 Semi-fixed (22k Ω)	ACP1026
	VR702, VR703	ACP1027
	Semi-fixed (47k Ω)	

Mark	Symbol & Description	Part No.
	VR704 Semi-fixed (220k Ω)	ACP1029
	R452, R453 (4.7 Ω /5W)	ACN1059
	R459	RD1/2PMFL560J
	R103, R104, R455, R457, R460	RD1/4PMFL $\square\square\square$ J
	R456, R458, R461, R480, R481	RS1LMF $\square\square\square$ J
	R101, R102, R451, R454,	RS2LMF $\square\square\square$ J
	R475 - R479	
	Other resistors	RD1/8PM $\square\square\square$ J

R. CRT Assembly (AWZ2534)**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	Q801	2SC2278
	D801	1SS252

COILS

Mark	Symbol & Description	Part No.
	L803	LAU101K
	L801, L802	LAU470K

CAPACITORS

Mark	Symbol & Description	Part No.
	C924 (1000p/2kV)	ACG1001
	C923 (4.7 μ /250V)	ACH-378
	C921	CEAS101M16
	C922	CKCYB681K50

RESISTORS

Mark	Symbol & Description	Part No.
	R755 Solid (47 Ω /1/2W)	ACN-225
	R752 Solid (1k Ω /1/2W)	ACN1006
	R751	RD1/8PM103J
	R753, R754	RS3LMF332J

OTHERS

Mark	Symbol & Description	Part No.
	CRT socket	AKG1003

G. CRT Assembly (AWZ2535)**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	Q821	2SC2278
	D821	1SS252

COILS

Mark	Symbol & Description	Part No.
	L823	LAU101K
	L821, L822	LAU470K

CAPACITORS

Mark	Symbol & Description	Part No.
C934	(1000p/2kV)	ACG1001
C933	(4.7 μ /250V)	ACH-378
C931		CEAS101M16
C932		CKCYB681K50

RESISTORS

Mark	Symbol & Description	Part No.
R765	Solid (47 Ω /1/2W)	ACN-225
R762	Solid (1k Ω /1/2W)	ACN1006
R761		RD1/8PM103J
R763,R764		RS3LMF332J

OTHERS

Mark	Symbol & Description	Part No.
	CRT socket	AKG1003

B. CRT Assembly (AWZ2536)**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
Q841		2SC2278
D841		1SS252

COILS

Mark	Symbol & Description	Part No.
L843		LAU101K
L841,L842		LAU470K

CAPACITORS

Mark	Symbol & Description	Part No.
C944	(1000p/2kV)	ACG1001
C943	(4.7 μ /250V)	ACH-378
C941		CEAS101M16
C942		CKCYB681K50

RESISTORS

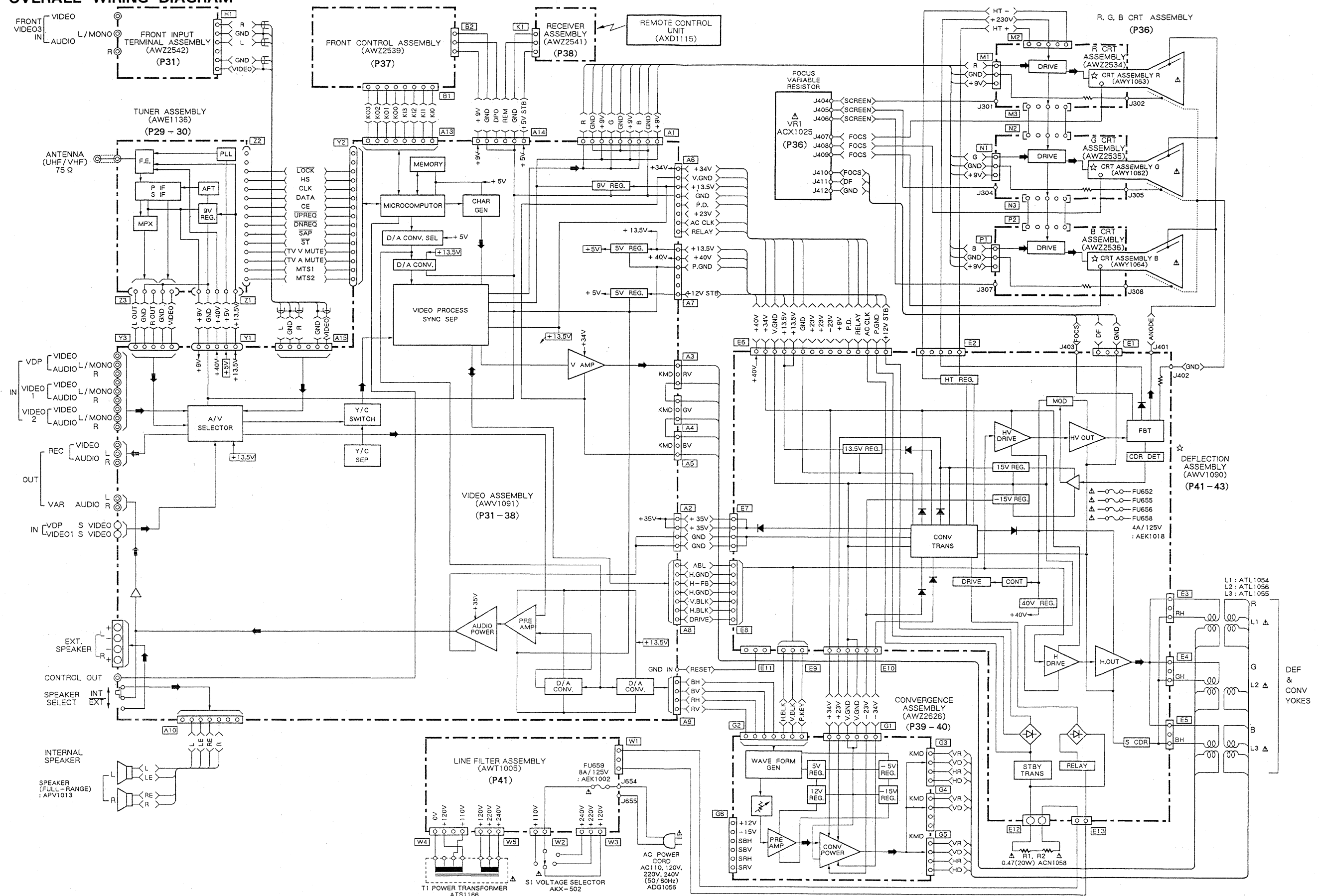
Mark	Symbol & Description	Part No.
R775	Solid (47 Ω /1/2W)	ACN-225
R772	Solid (1k Ω /1/2W)	ACN1006
R771		RD1/8PM103J
R773,R774		RS3LMF332J

OTHERS

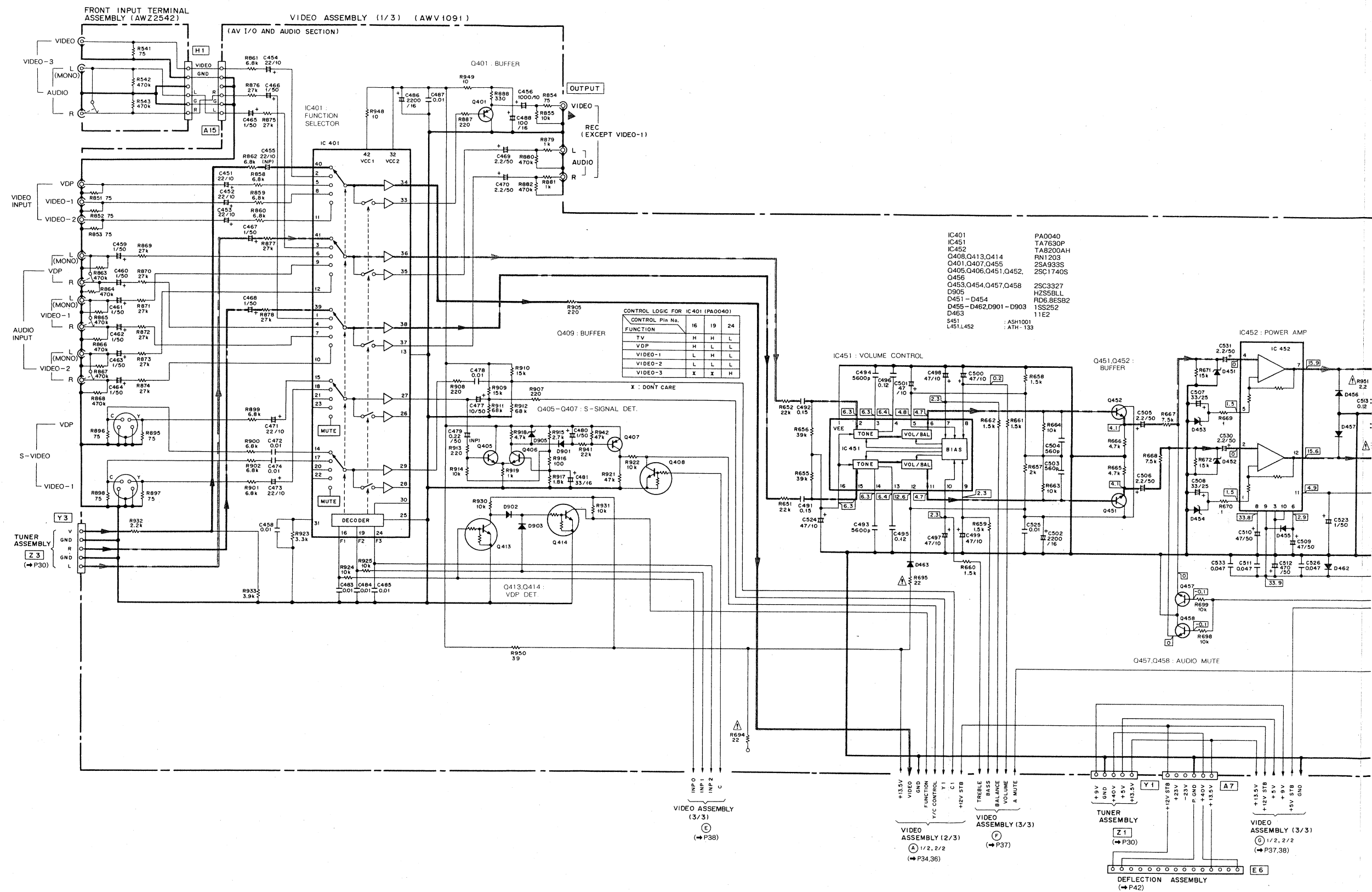
Mark	Symbol & Description	Part No.
	CRT socket	AKG1003

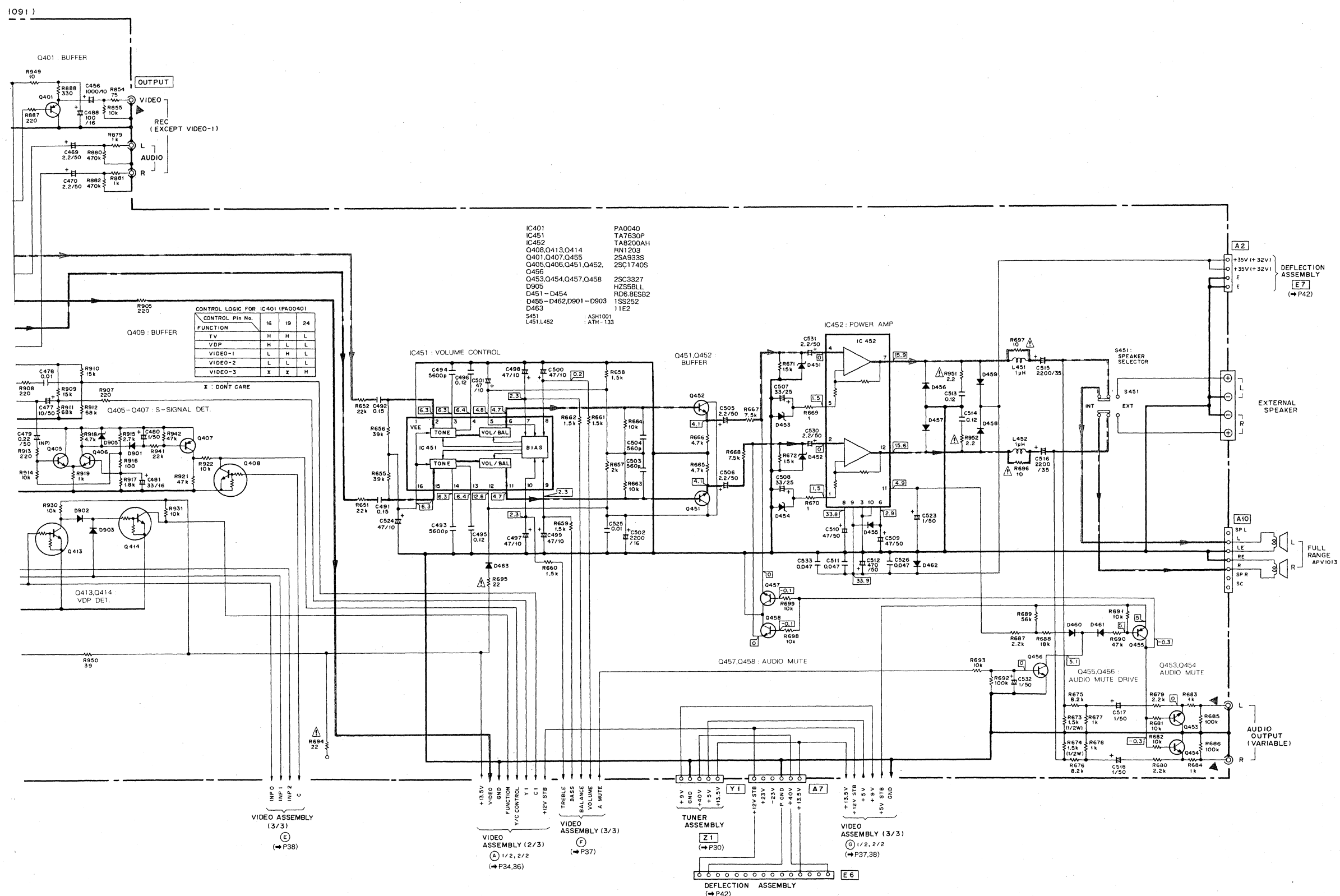
8. SCHEMATIC AND P.C. BOARDS DIAGRAMS

8.1 OVERALL WIRING DIAGRAM



8.3 VIDEO (1/3), FRONT INPUT TERMINAL ASSEMBLIES





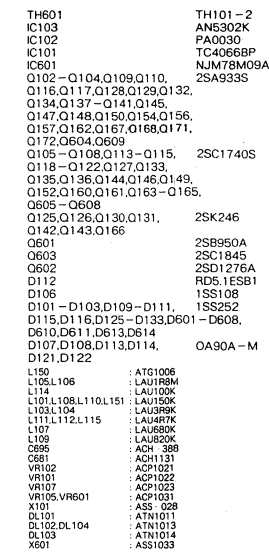
A

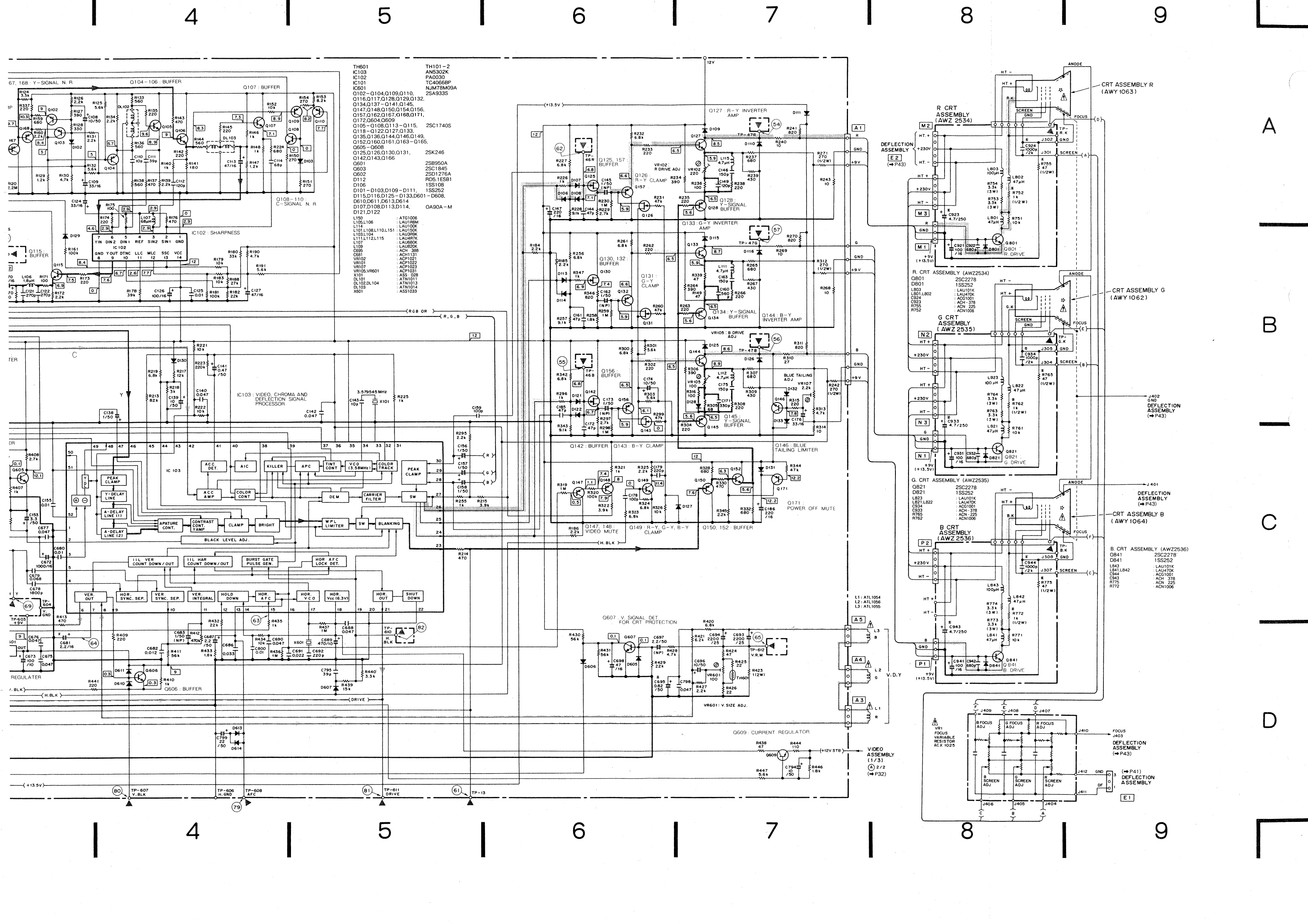
B

C

D

VIDEO ASSEMBLY (2/3) (AWV 1091)
(VIDEO SECTION)







6



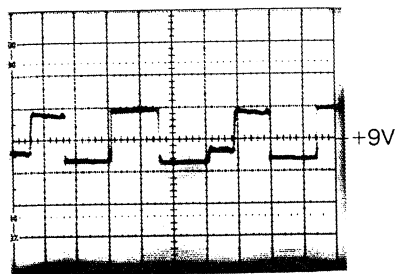


The waveforms at each position

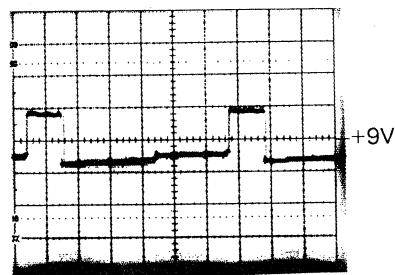
Input signal ;

⑤4 - ⑧1 : color bar VDP input
Picture quality : standard
Range : DC range (without notice)

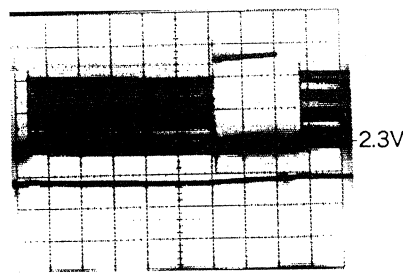
⑤4 TP-47R
V : 1V/div, H : 10 μ sec/div



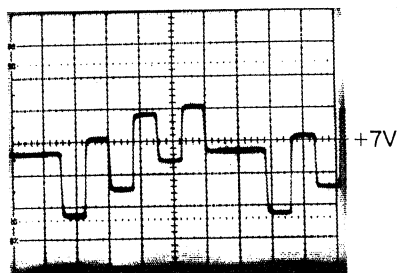
⑤7 TP-47G
V : 1V/div, H : 10 μ sec/div



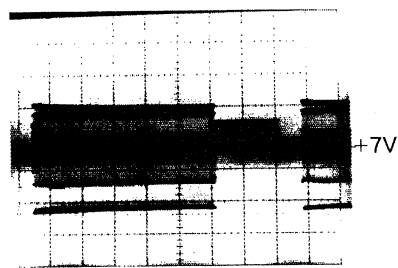
⑤9 TP-05
V : 100mV/div, H : 2msec/div



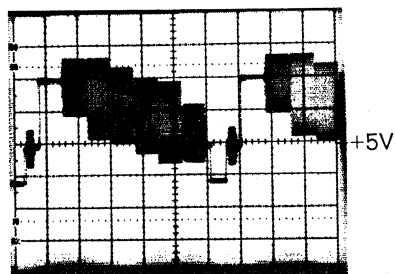
⑤5 TP-46B
V : 1V/div, H : 10 μ sec/div



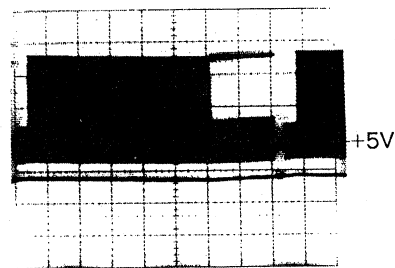
V : 1V/div, H : 2 μ sec/div



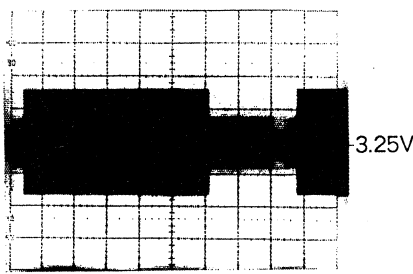
⑤8 TP-12
V : 500mV/div, H : 10 μ sec/div



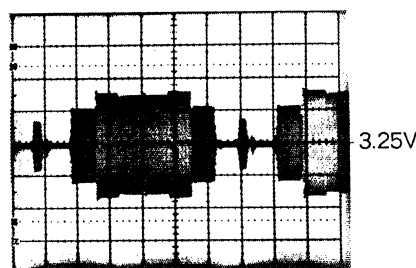
V : 500mV/div, H : 2mV/div



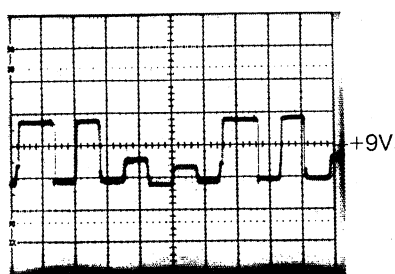
⑥0 TP-41
V : 100mV/div, H : 2msec/div



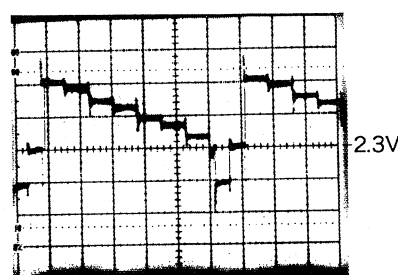
V : 100mV/div, H : 10 μ sec/div



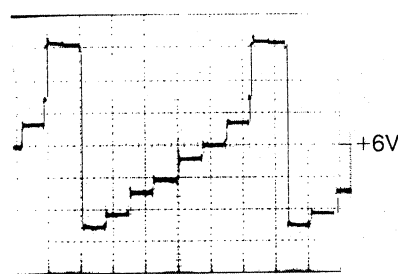
⑤6 TP-47B
V : 1V/div, H : 10 μ sec/div



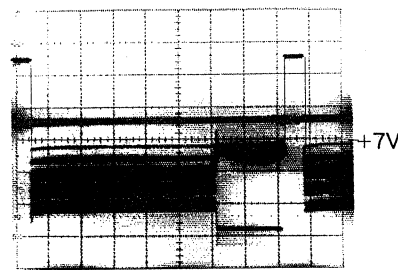
⑤9 TP-05
V : 100mV/div, H : 10 μ sec/div



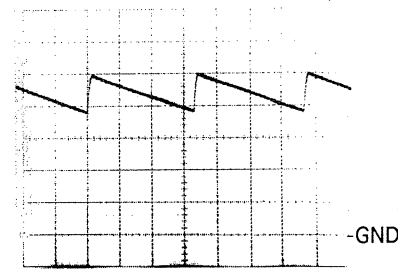
⑥1 TP-13
V : 500mV/div, H : 10 μ sec/div



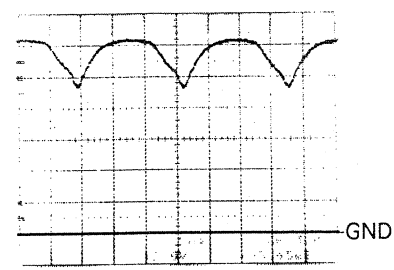
⑥1 TP-13
V : 1V/div, H : 2msec/div



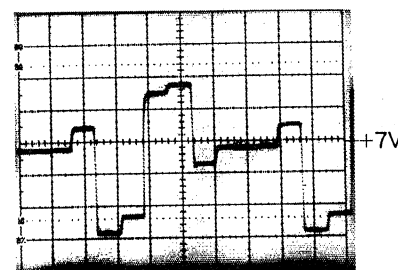
⑥4 C681 (+ side
for TP-604 (V.GND)
V : 1V/div, H : 5msec/div



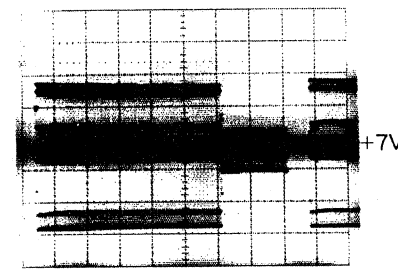
⑥8 Q662 Collector for V.GND
V : 20V/div, H : 5msec/div



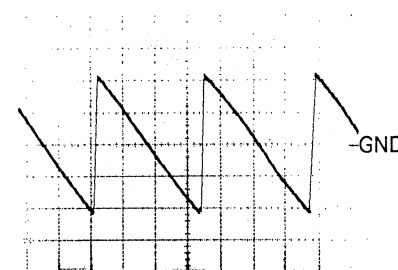
⑥2 TP-46R
V : 1V/div, H : 10 μ sec/div



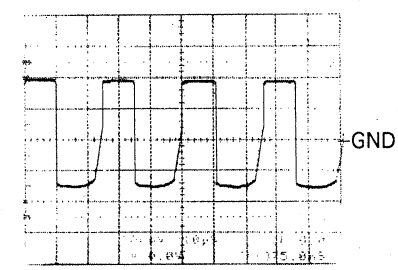
V : 1V/div, H : 2msec/div



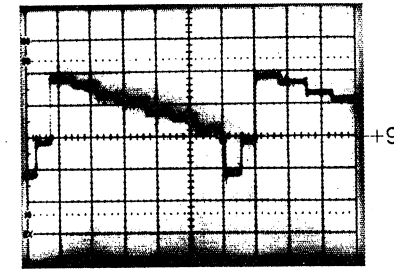
⑥5 TP-612 (V.R.M)
for TP-605 (V.GND)
V : 0.5V/div, H : 5msec/div



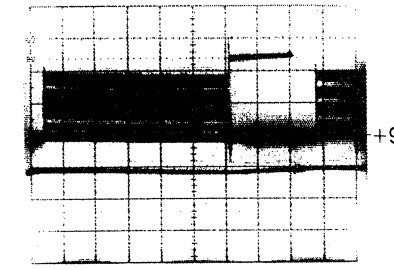
⑥6 D655 Cathode
V : 5V/div, H : 10 μ sec/div



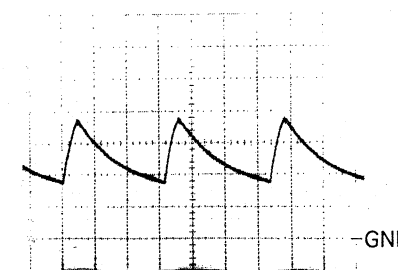
⑥9 TP-01
V : 500mV/div, H : 10 μ sec/div



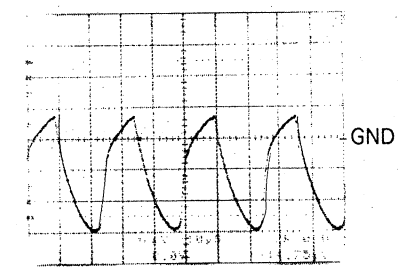
V : 500mV/div, H : 2msec/div



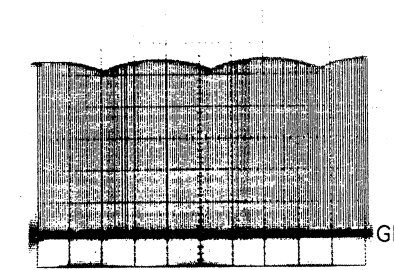
⑥3 IC103 Pin 15
for TP-606 (H.GND)
V : 1V/div, H : 20 μ sec/div



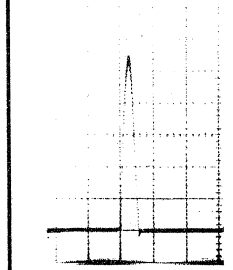
⑥7 C719 (both sides)
V : 2V/div, H : 10 μ sec/div



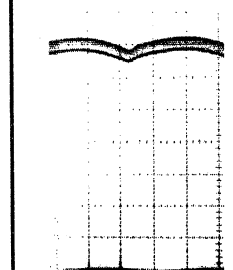
⑦0 Q560 Collector
for TP-554 (H.GND)
V : 200V/div, H : 5msec/div



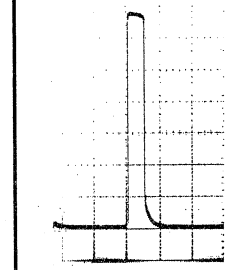
⑦0 Q560 Collector
for TP-554 (H.GND)
V : 200V/div,



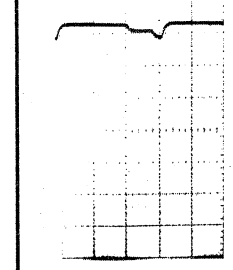
⑦1 TP-553 (H.OI
for TP-554 (H.OI)
V : 20V/div,

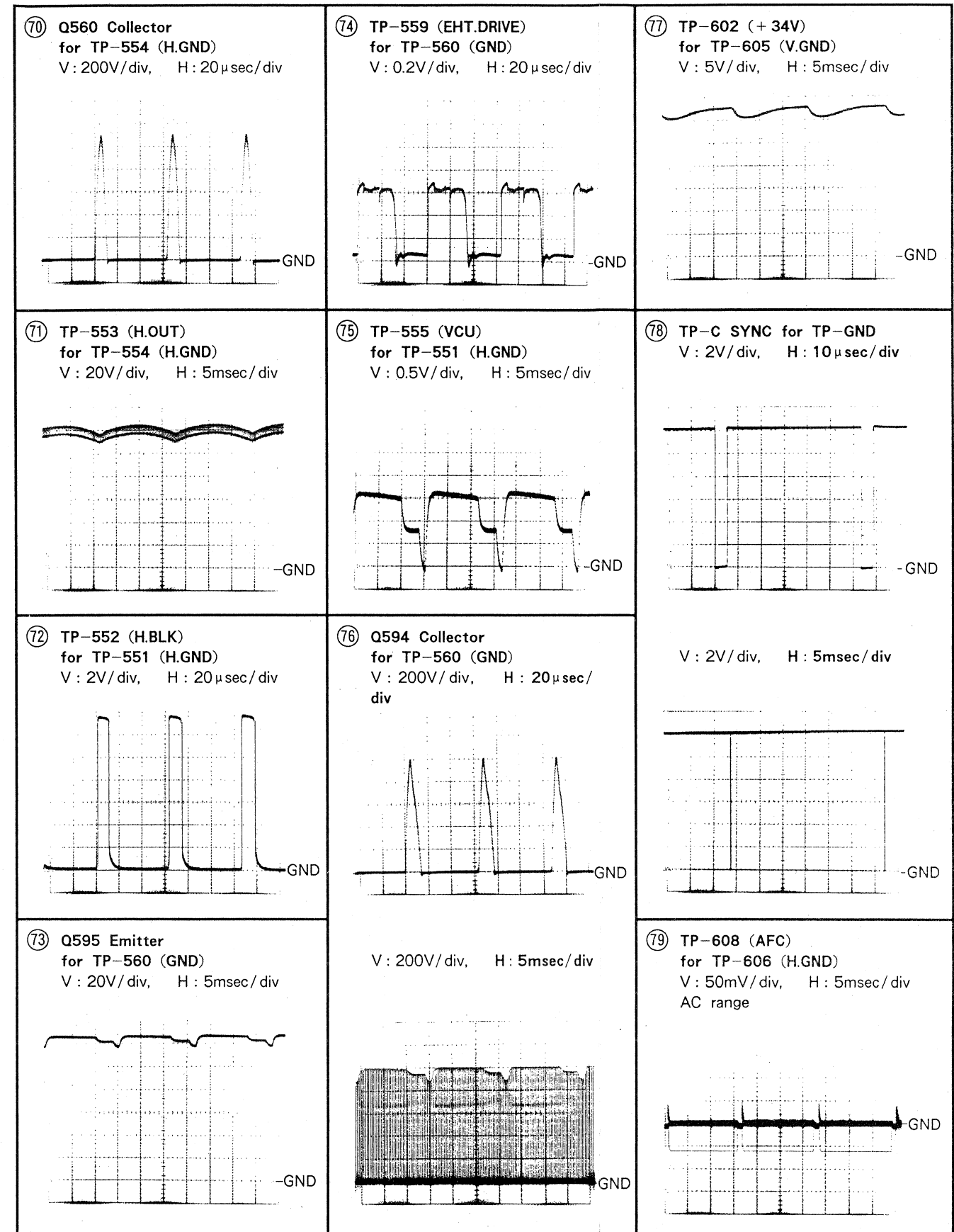
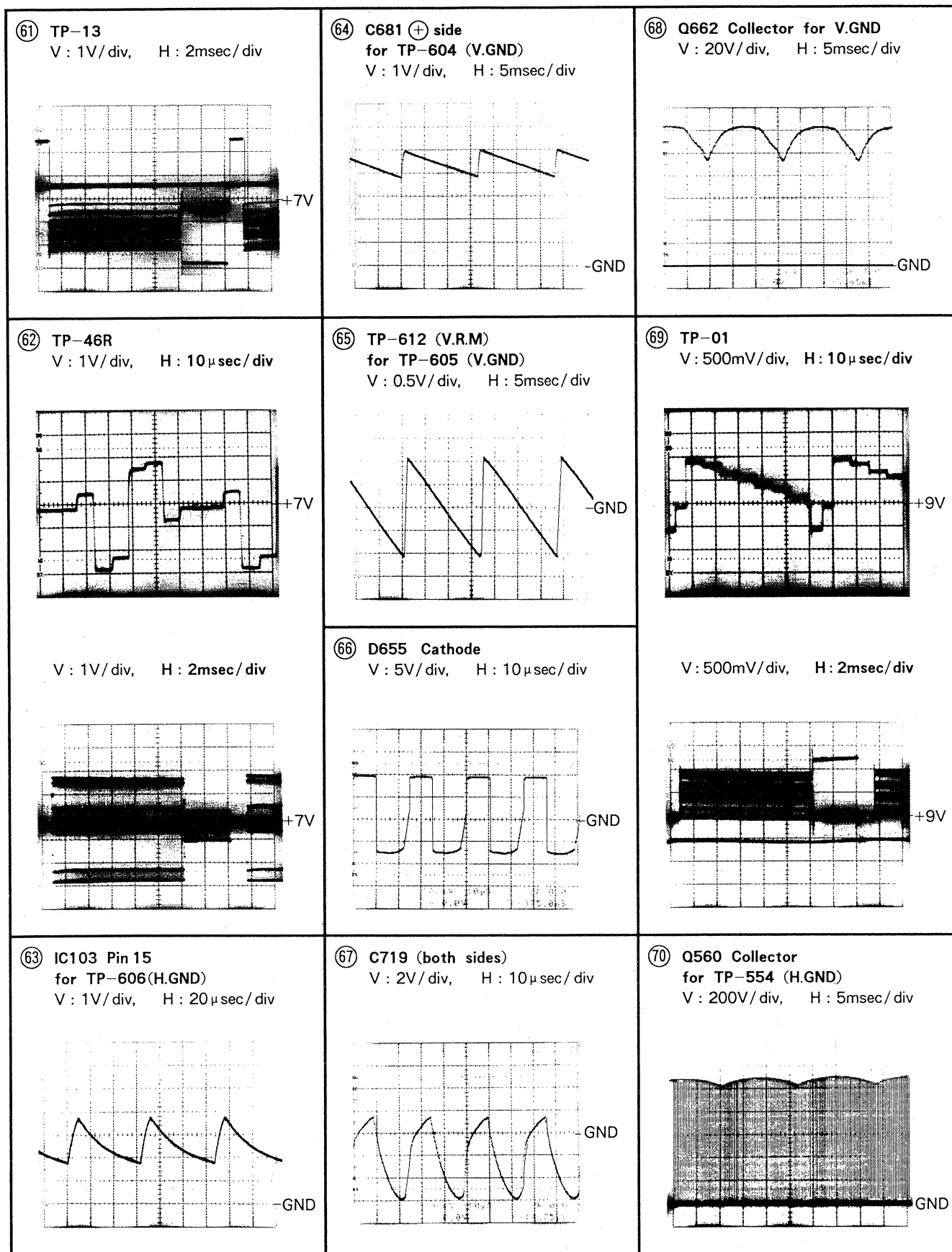


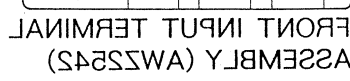
⑦2 TP-552 (H.BI
for TP-551 (H.BI)
V : 2V/div,



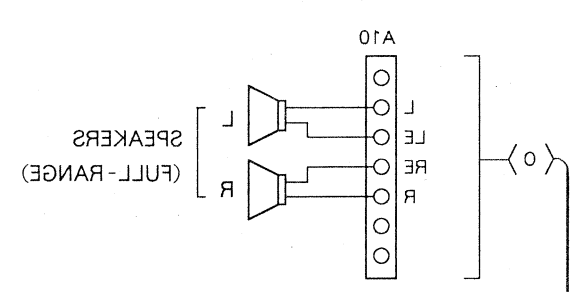
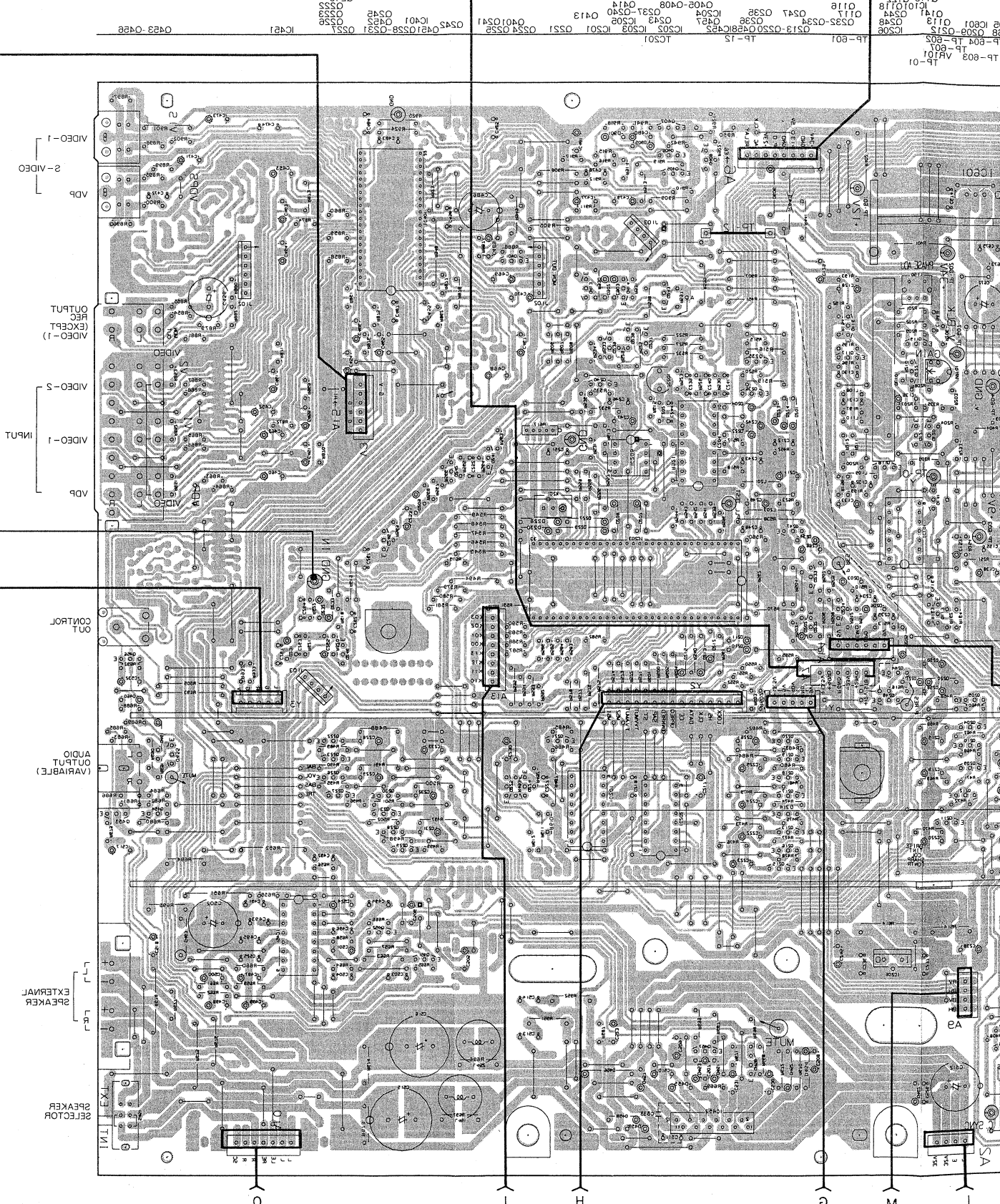
⑦3 Q595 Emitter
for TP-560 (H.GND)
V : 20V/div,



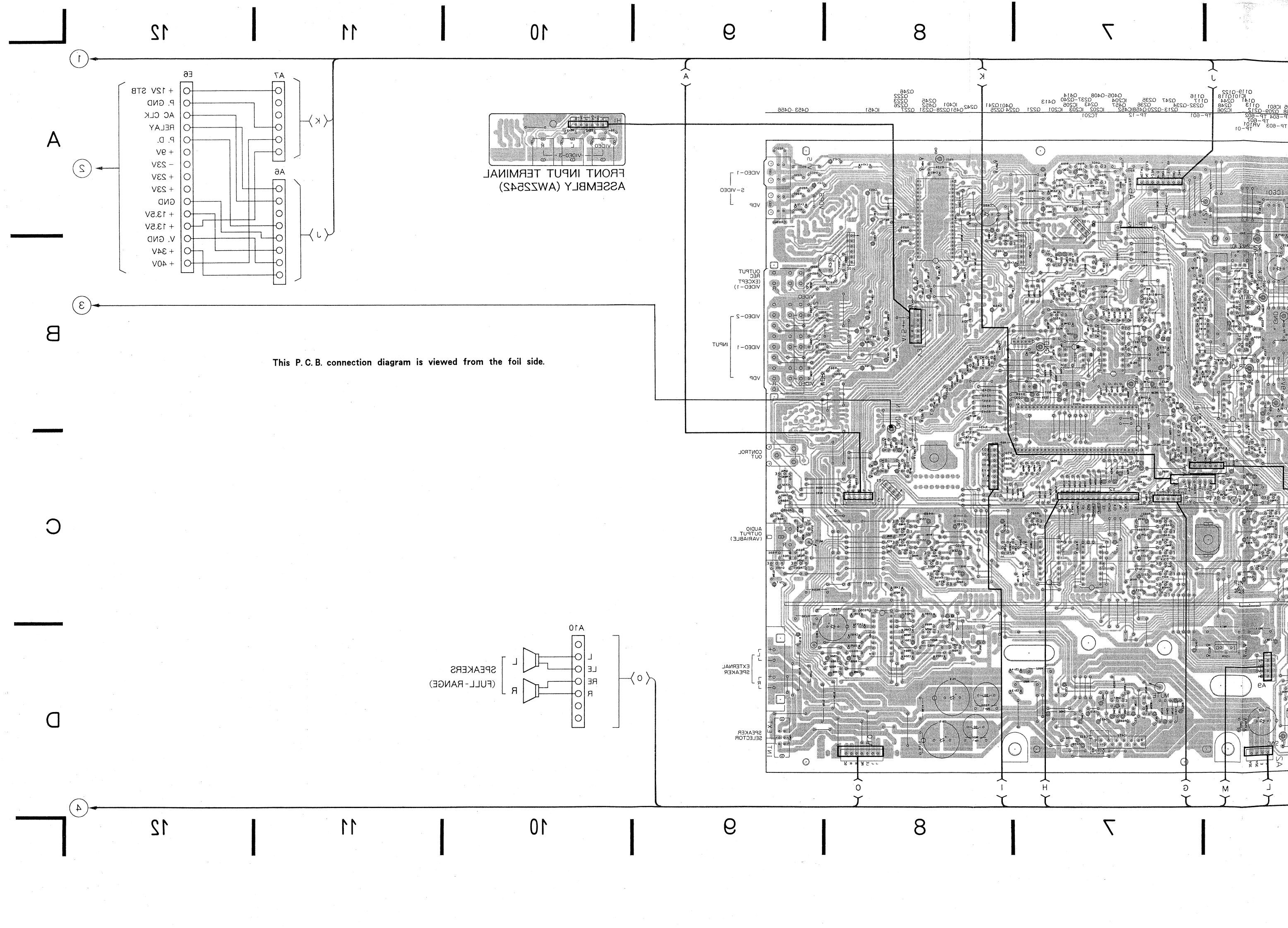
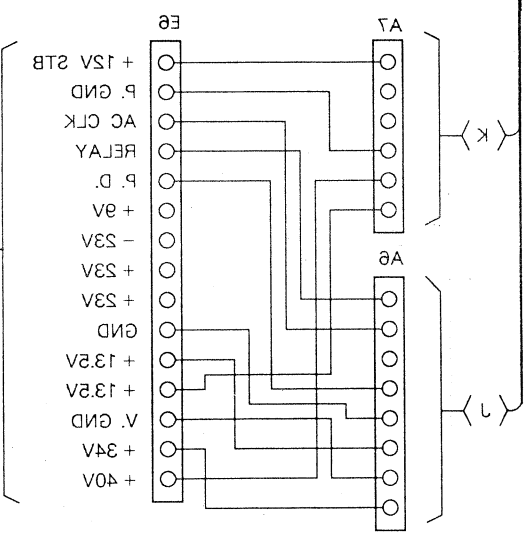


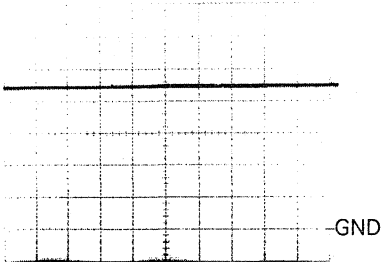
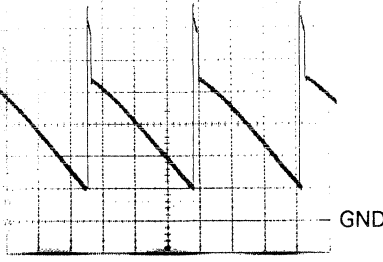
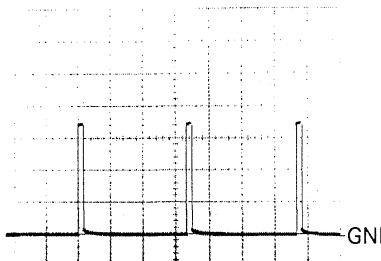
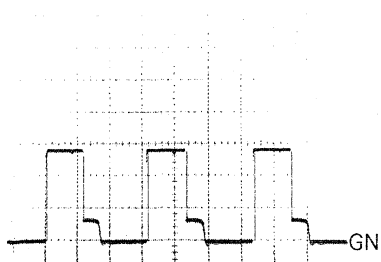
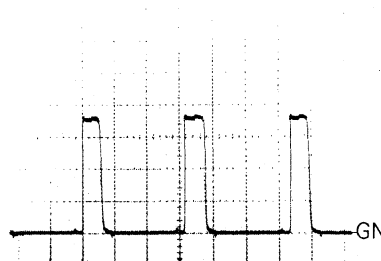


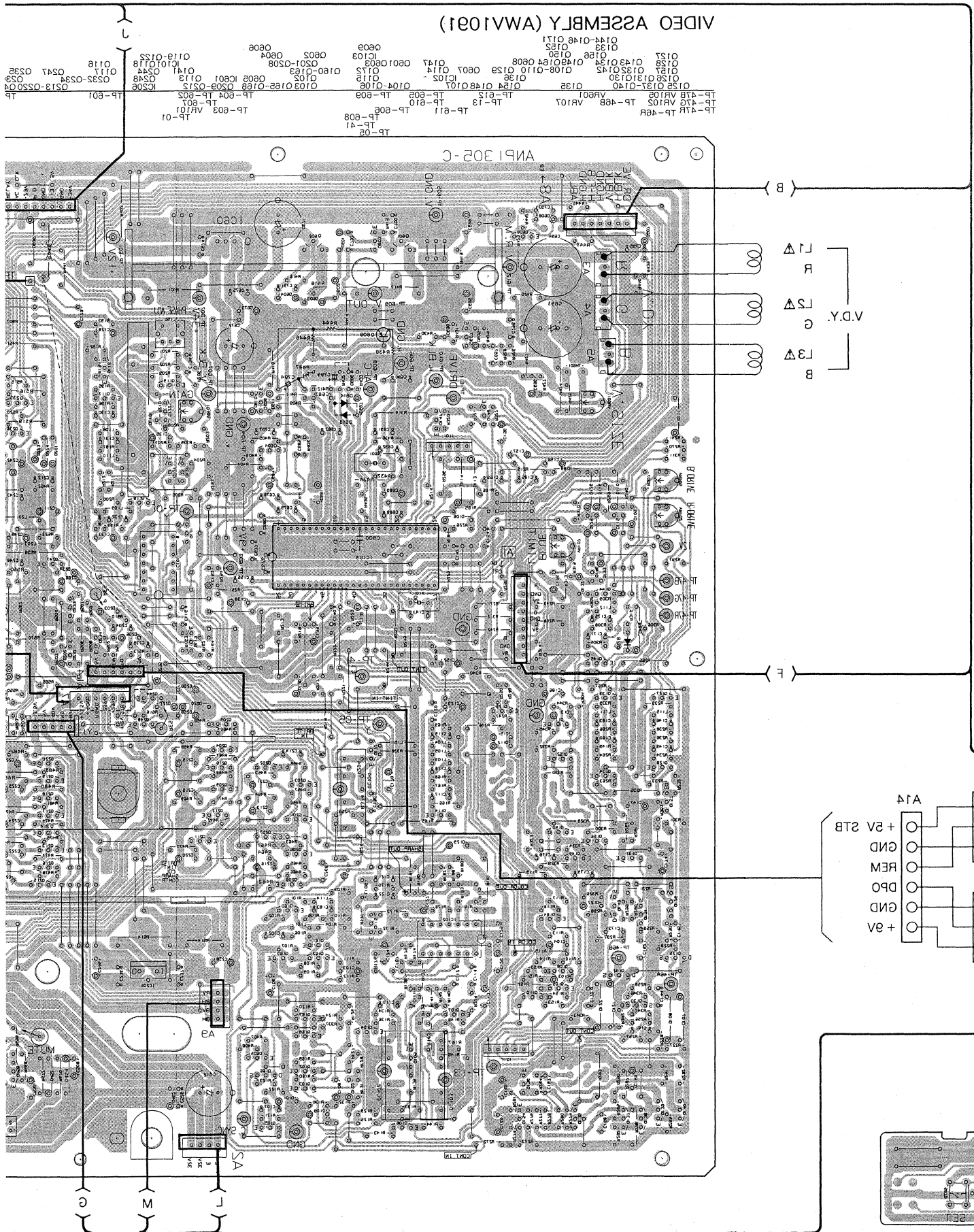
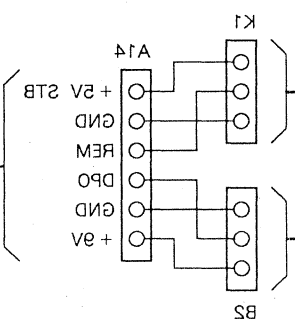
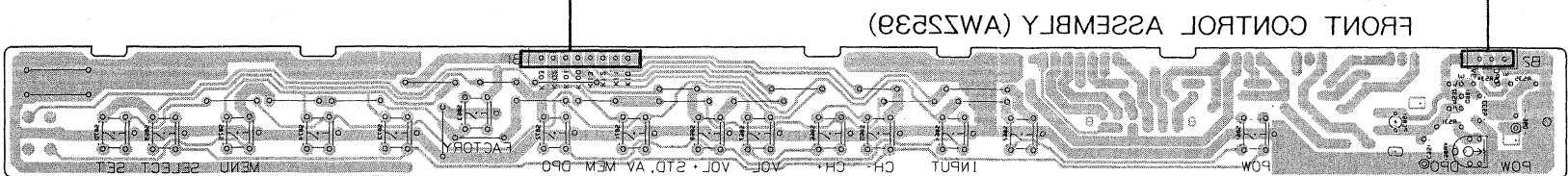
ASSEMBLY (AW52542)
FRONT INPUT TERMINAL



This P.C.B. connection diagram is viewed from the foil side.



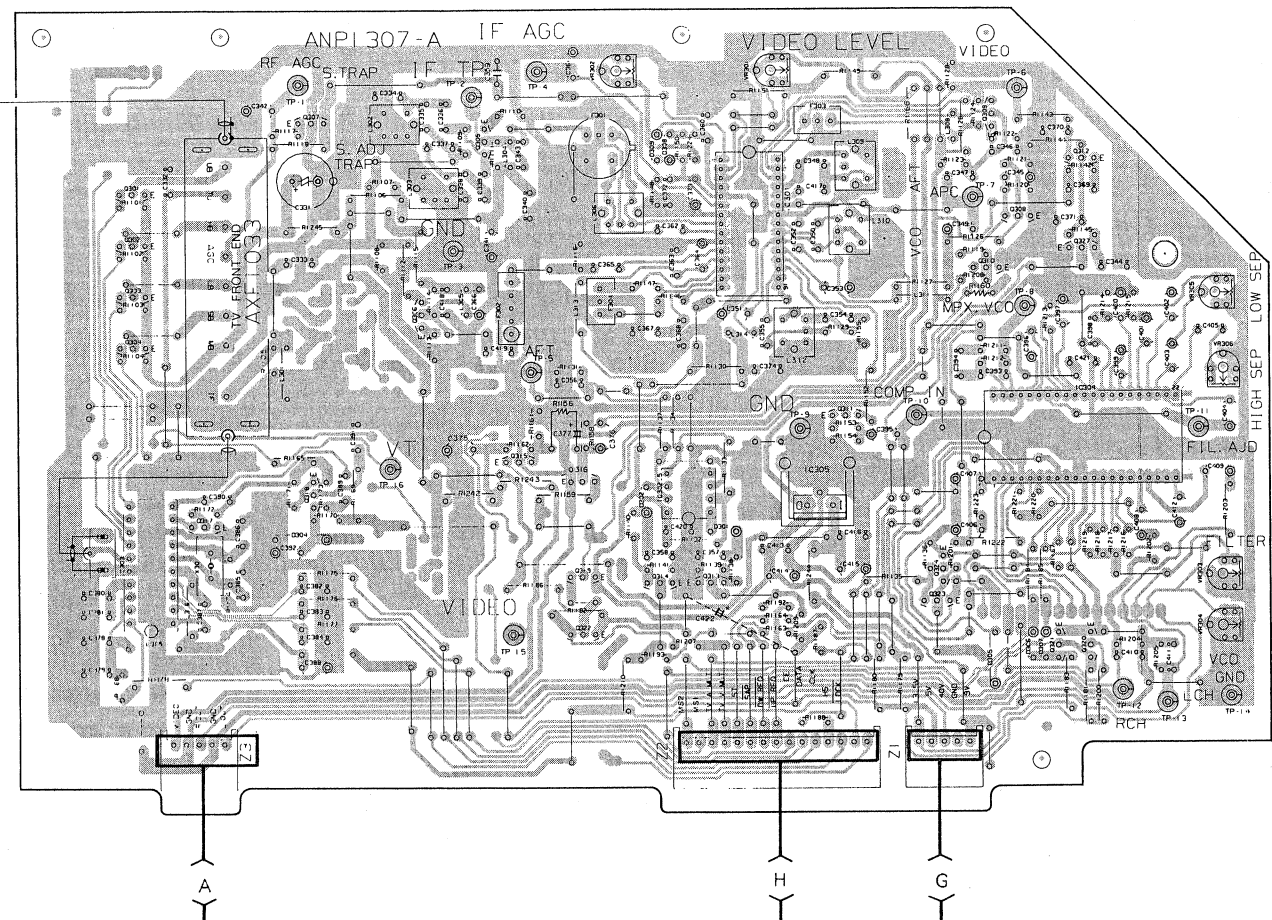
⑦⑨ TP-608 (AFC) for TP-606 (H.GND) V : 1V/div, H : 5msec/div  GND	⑧③ TP-609 (V. OUT) for TP-605 (V.GND) V : 5V/div, H : 5msec/div  GND	
⑧④ TP-607 (V. BLK) for TP-604 (V.GND) V : 2V/div, H : 5msec/div  GND		
⑧① TP-611 (DRIVE) for TP-606 (H.GND) V : 1V/div, H : 20μsec/div  GND		
⑧② TP-610 (H. BLK) for TP-606 (H.GND) V : 0.5V/div, H : 20μsec/div  GND		



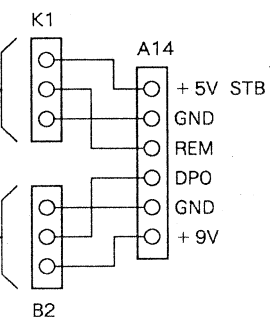
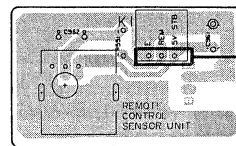
8.8 P.C. BOARDS PATTERN

TUNER ASSEMBLY (AWE1136)

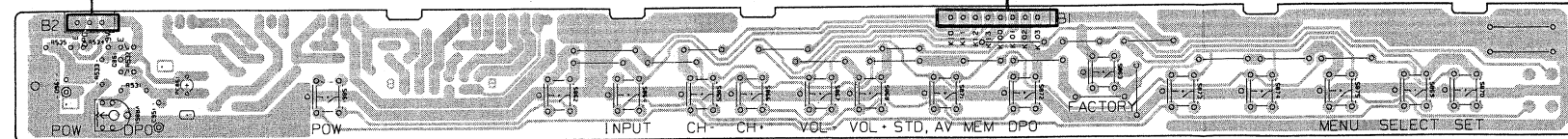
Q301-Q304 IC303 Q317 Q307 Q318 TP-1 TP-16 TP-2 TP-3 TP-4 TP-5 Q306 Q305 Q315 Q316 Q319 Q322 IC302 Q314 Q313 IC301 IC305 Q311 Q324 Q309 Q323 Q310 Q308 Q321 Q320 Q312 Q327 Q328 TP-12 TP-11 TP-13 TP-14 VR303-VR306 TP-10 TP-7 TP-6 TP-8



RECEIVER ASSEMBLY (AWZ2541)

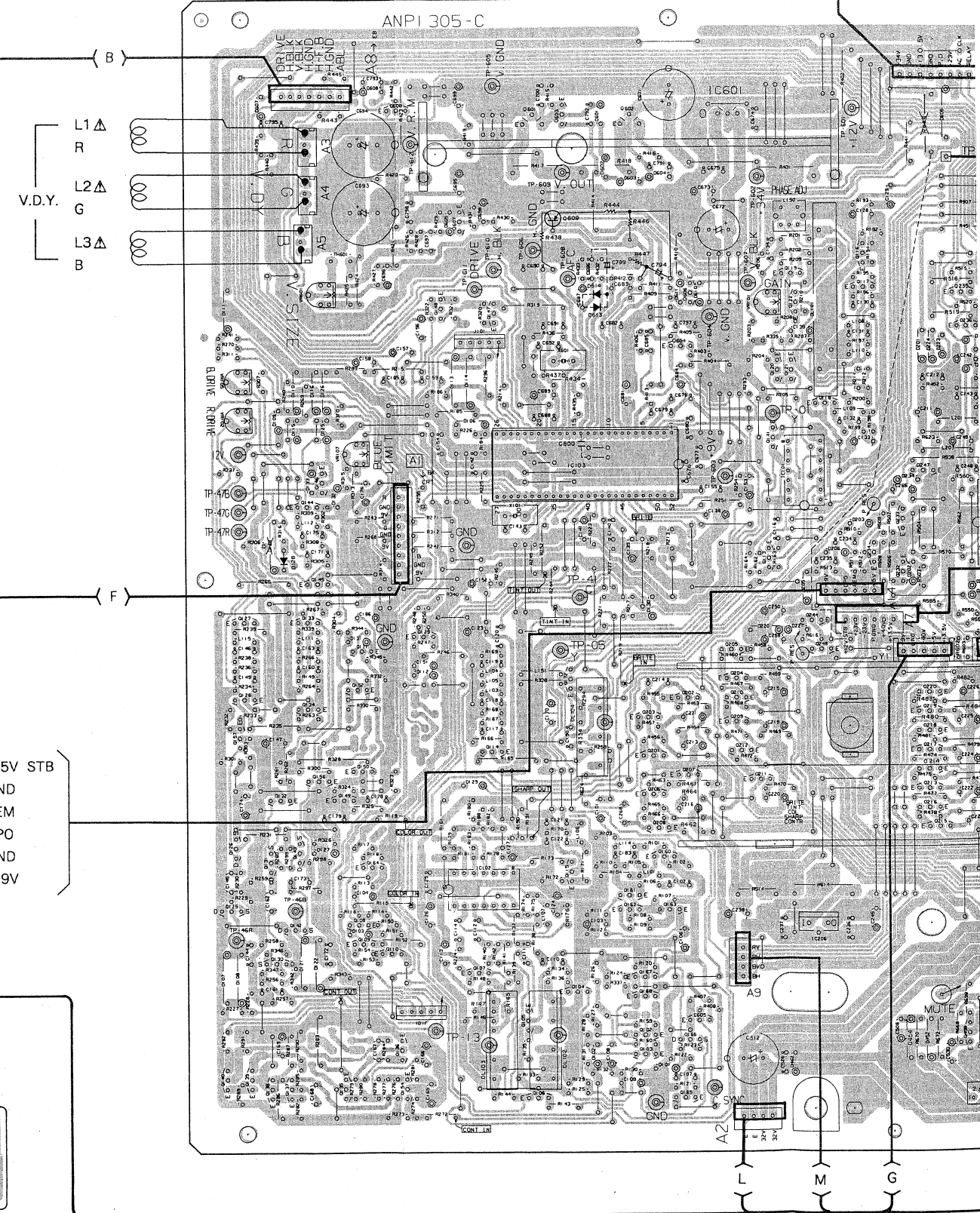


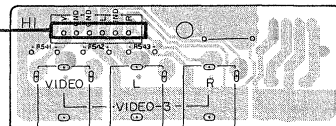
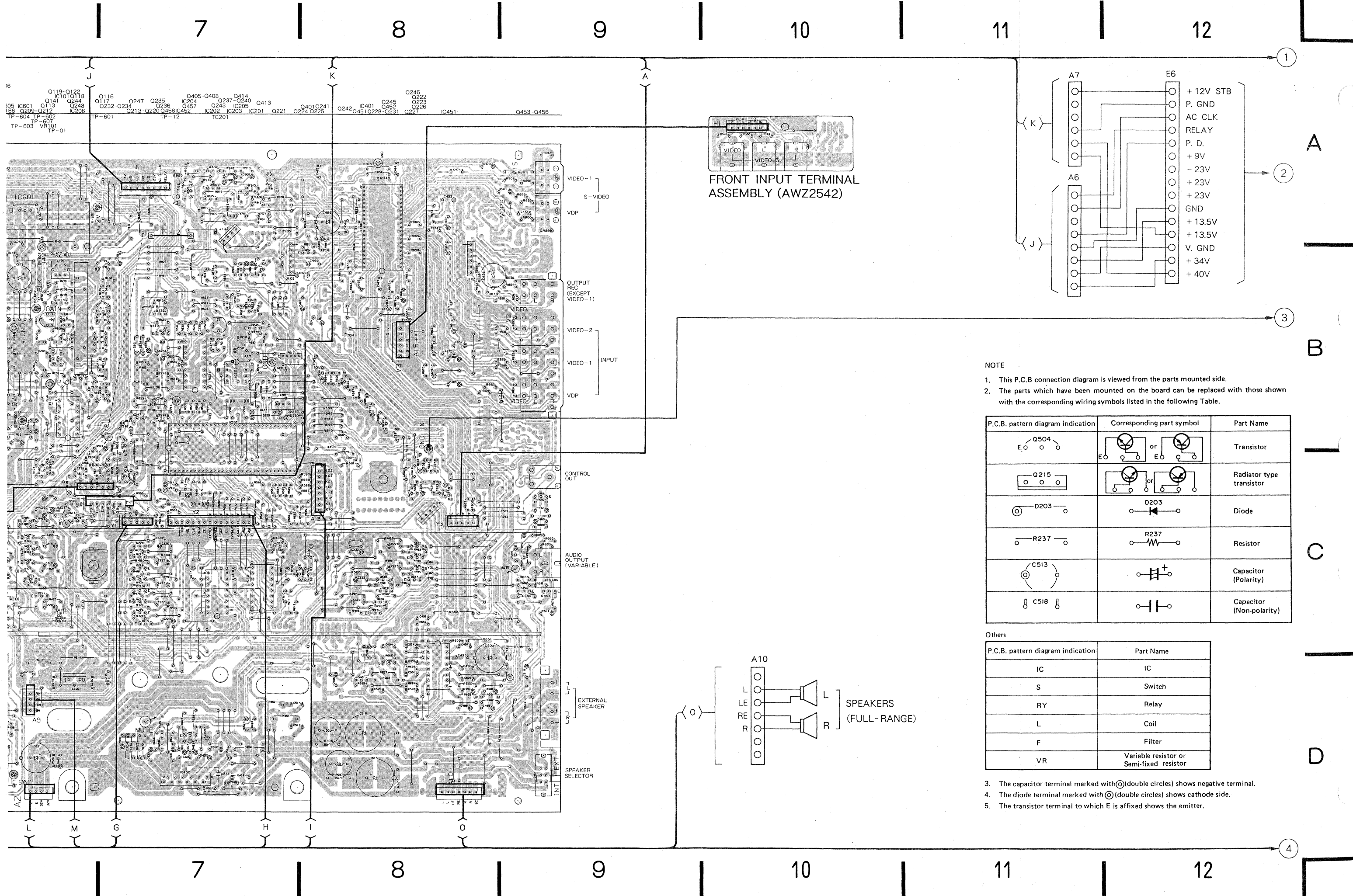
FRONT CONTROL ASSEMBLY (AWZ2539)



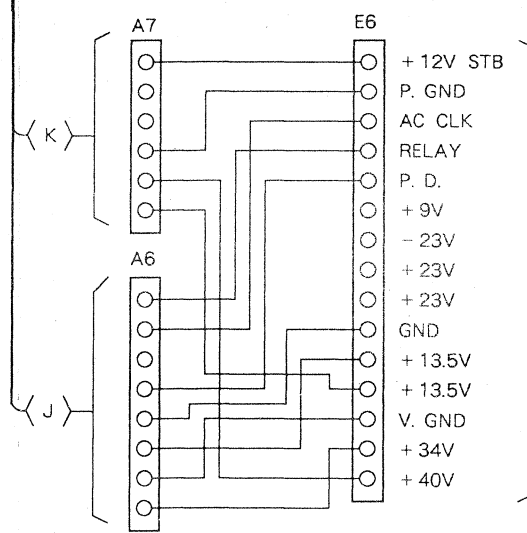
VIDEO ASSEMBLY (AWV1091)

Q144-Q146 Q171 Q133 Q156 Q150 Q609 IC103 Q602 Q604 Q119-Q122 Q110 Q118 Q116 Q247 Q235 Q127 Q128 Q143 Q134 Q149 Q164 Q608 Q129 Q607 Q147 Q601 Q603 Q72 Q160-Q159 Q157 Q132 Q142 Q108-Q111 Q136 Q114 Q115 Q102 Q104-Q106 Q103 Q165-Q168 Q605 IC601 Q113 Q248 Q232-Q234 Q213-Q220 Q41 Q125 Q137-Q140 Q135 Q154 Q148 Q107 TP-512 TP-609 TP-603 TP-610 TP-606 TP-608 TP-41 TP-05 TP-47B VR105 TP-47G VR102 TP-46B VR107 TP-611 TP-604 TP-602 TP-607 TP-601 TP-605





FRONT INPUT TERMINAL ASSEMBLY (AWZ2542)



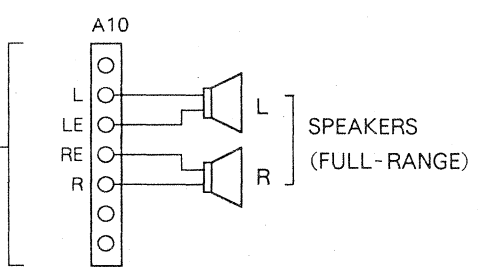
- NOTE
- 1. This P.C.B connection diagram is viewed from the parts mounted side.
 - 2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
		Transistor
		Radiator type transistor
		Diode
		Resistor
		Capacitor (Polarity)
		Capacitor (Non-polarity)

Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

- 3. The capacitor terminal marked with ⊙ (double circles) shows negative terminal.
- 4. The diode terminal marked with ⊙ (double circles) shows cathode side.
- 5. The transistor terminal to which E is affixed shows the emitter.



1

2

3

4

5

6

- mark shows the charged section (Power supply primary side circuit).
- mark shows a high voltage generation point.
- Parts marked by ☆ are important parts which use X-rays.
- If any of these parts need to be replaced, always replace with specified parts.

AC POWER CORD
AC 110V, 120V, 220V, 240V
/ 50/60Hz

LINE FILTER
ASSEMBLY (AWT1005)

FU659 8A 125V

CAUTION -
-FOR CONTINUED PROTECTION AGAINST
FIRE HAZARD, REPLACEMENT FUSE SHOULD BE OF THE SAME TYPE
AND RATING ONLY.

ATTENTION -
-POUR LES PRECAUTIONS CONTINUËLLES CONTRE L'INCENDIE
LES FUSIBLES A REMPLACER DOIVENT ÊTRE LES MEMES TYPES ET
VALEURS NOMINALES.

W5 120V
220V
240V

110V W4
120V
0V

△ T1 POWER
TRANSFORMER

☆ DEFLECTION ASSEMBLY (AWV1090)

CONVERGI

FOCUS

ANODE

ANP1306-C

TP-553 TP-557 TP-558
TP-559

TP-551 TP-554 TP-552 TP-555
TP-556 VR551 TP-561

E5
△ L3
H. DY
B

E4
△ L2
H. DY
G

E3
△ L1
H. DY
R

1

2

3

4

5

6

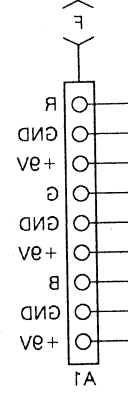


A

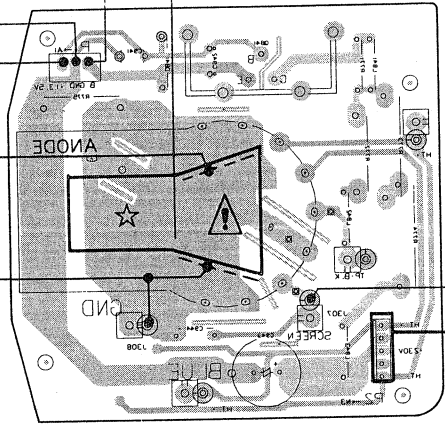
B

C

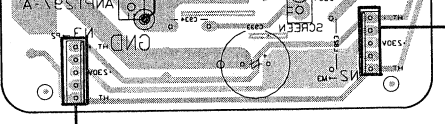
D



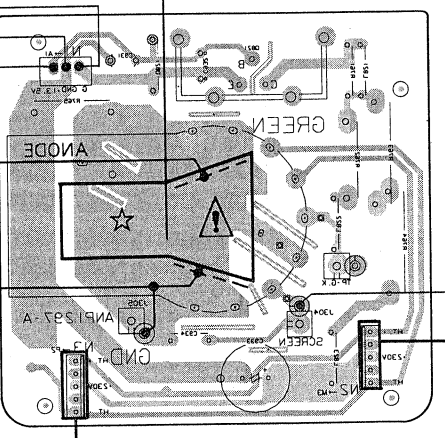
CRT ASSEMBLY B (AWY1084)



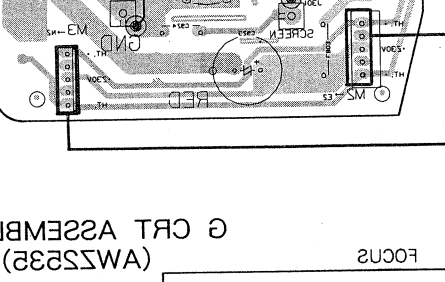
B CRT ASSEMBLY (AW2536)



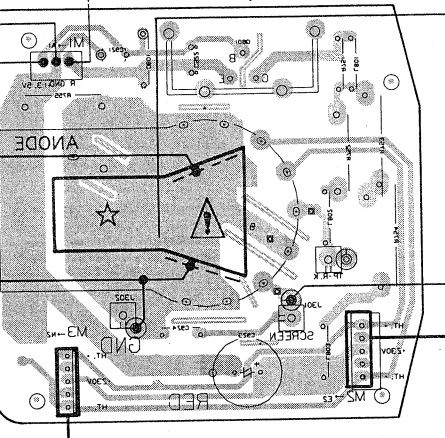
CRT ASSEMBLY G (AWY1085)



G CRT ASSEMBLY (AW2535)

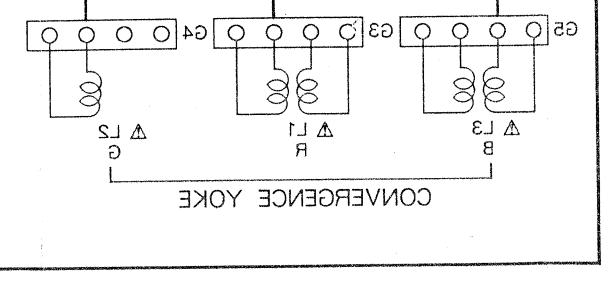
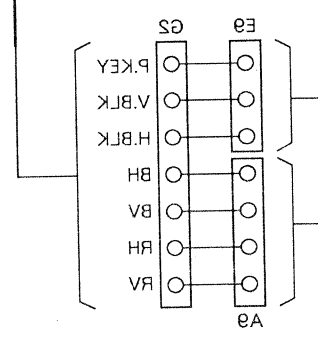
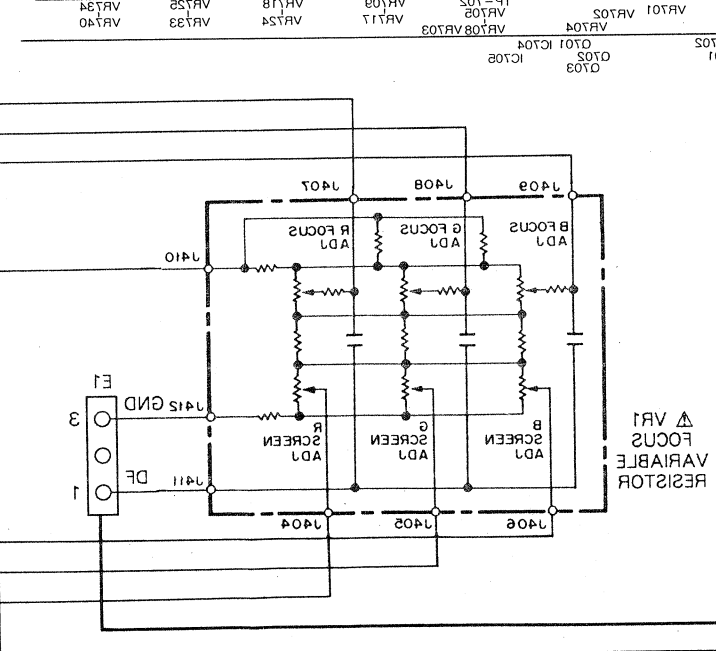
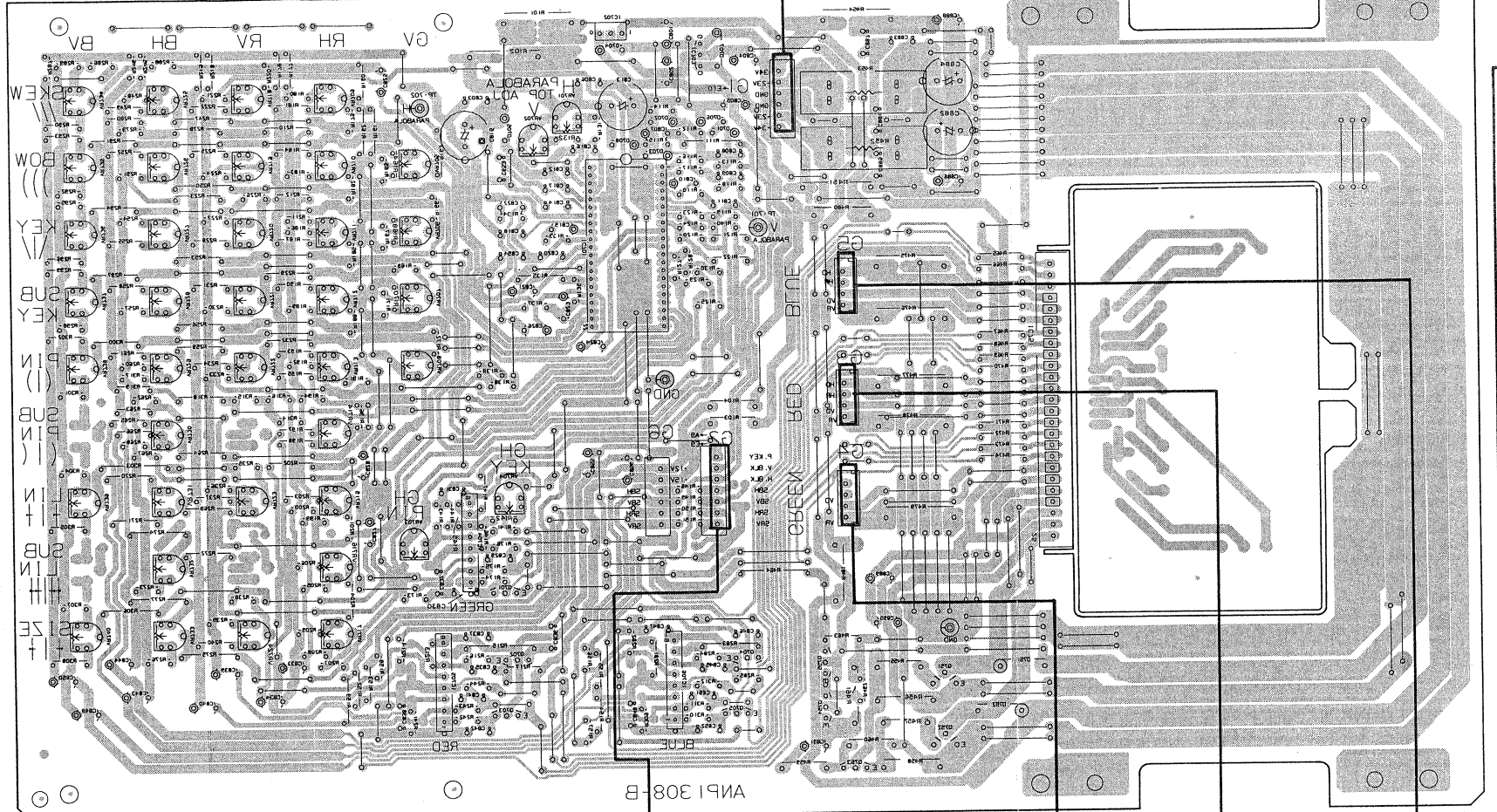


CRT ASSEMBLY R (AWY1083)

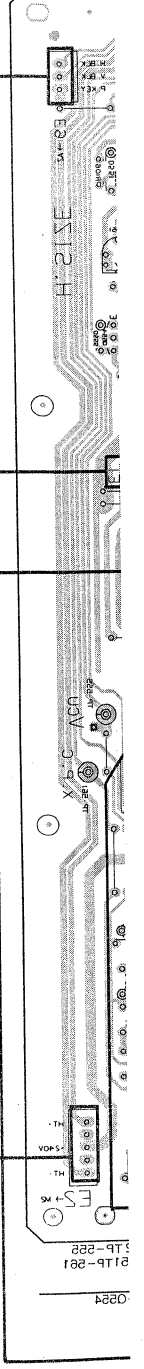


R CRT ASSEMBLY (AW2534)

This P.C.B. connection diagram is viewed from the foil side.



CONVERGENCE ASSEMBLY (AW2535)



Compensation	Signal and mark * 1	Compensating signal	Distorted screen	Corrected screen	Distorted screen	Adjustment point	
Horizontal distortion compensation	H - SKEW 	 V sawtooth wave				Observe the vertical lines in the center of the screen (where there is no H-KEY, H-S-KEY, H-PIN nor H-S-PIN movement), then adjust the vertical lines to eliminate lean.	To obtain the best possible lines, adjust the vertical lines in the center of the screen following the adjustment procedure of H-SKEW and H-BOW.
	H - BOW 	 V parabolic wave				Observe the vertical lines in the center of the screen, then adjust the bowed lines to straight lines.	
	H - KEY 	 V sawtooth wave × H sawtooth wave				Observe the vertical lines in the right section of the screen (where there is no H-S-KEY nor H-S-PIN movement), then adjust the vertical lines to eliminate lean.	To eliminate lean, adjust the vertical lines in the right and left sections of the screen following the adjustment procedure of H-KEY and H-S-KEY.
	H - S - KEY V sawtooth wave × 1/2 H sawtooth wave					Observe the vertical lines in the left section of the screen, then adjust the vertical lines to eliminate lean.	
	H - PIN 	 V parabolic wave × H sawtooth wave				Observe the vertical lines in the right and left sections of the screen, then adjust the bowed lines to symmetrize the right and left by H-S-PIN. And adjust the bowed vertical lines in the right and left sections of the screen to straight lines by H-PIN.	To eliminate distortion, straighten the vertical lines in the right and left sections of the screen following the adjustment procedure of H-PIN and H-S-PIN.
	H - S - PIN V parabolic wave × H parabolic wave						

Compensation	Signal and mark * 1	Compensating signal	Distorted s
Horizontal interval compensation	H - LIN 	 H parabolic wave	
	H - S - LIN 		
	H - SIZE 		
	H - POSITION 	DC voltage	

Note: KEY is short and LIN for
 ▽: denotes
 ▼: denotes
 * 1: Sketch is prior

Fig. 9-3 Horizontal compensation

9. ADJUSTMENT

- Adjustment items are described as follows.

9.1 When TUNER assembly is repaired.

9.2 When TUNER assembly is replaced.

9.3 When VIDEO assembly is repaired.

9.3.1 Video section.

9.3.2 Microcomputer section.

9.4 When VIDEO assembly is replaced.

9.4.1 Video section.

9.4.2 Microcomputer section.

9.5 When DEFLECTION assembly is repaired.

9.5.1 Power supply section.

9.5.2 Deflection section.

9.6 When DEFLECTION assembly is replaced.

9.6.1 Power supply section

9.6.2 Deflection section.

9.7 When CONVERGENCE assembly is repaired or replaced.

9.8 When FRONT CONTROL assembly is repaired.

9.9 When FRONT CONTROL assembly is replaced.

9.10 When R, G or B CRT assembly is repaired or replaced.

9.11 When CRT assembly R, G or B is replaced.

9.12 When lens assembly is replaced.

9.13 When other assemblies are repaired or replaced.

9.14 DPO level setting.

9.15 DPO sensitivity adjustment.

9.16 Anode cable connection and disconnection.

- These adjustment procedures are described separately for adjustments following assembly exchange and adjustments following repairs.

- When replacing the assemblies, always use recommended replacements.

- Symbols in parentheses next to the adjustment position () indicate denotes the relevant assembly to be adjusted.

V : VIDEO assembly

C : CONVERGENCE assembly

F : FRONT CONTROL assembly

D : DEFLECTION assembly

T : TUNER assembly

VR : Focus variable resistor (VR1)

- The adjustment points and TP terminals on the each assemblies are shown in Fig.9-6 thru 9-9.
Fig.9-6 : VIDEO assembly, TUNER assembly, rear panel and DEFLECTION assembly.

Fig.9-7 : Front panel, FRONT CONTROL assembly, CONVERGENCE assembly and focus variable resistor.

Fig.9-8 : B CRT assembly, G CRT assembly and deflection yoke.

Fig.9-9 : Lens assembly (Red, Green, Blue).

- Set the input terminals at the rear panel as follows unless otherwise noted.

VIDEO signal : INPUT VDP VIDEO terminal

AUDIO signal : INPUT VDP AUDIO terminal

- Set the picture quality to standard (screen displayed "STD") by remote control unit unless otherwise noted.

9.1 WHEN TUNER ASSEMBLY IS REPAIRED

- Connection diagram is referred to Fig. 9-1.
- Adjustment points and test points (TP) are shown in Fig. 9-6-1.
- Perform the adjustment set to the TEST mode (Note 1).
- Perform the adjustment by using the channel 9 unless otherwise noted.
- Video and audio input signals are described in the below.

Video signal

V①; f_v = EIA color bar, 60dB μ V

Ⓝ; No signal (No carrier)

Audio signal (MONO)

S①; f_A = 1kHz, 100 % MOD, 54dB μ V

Audio signal (STEREO); dbx noise reduction ON,
PRE-EMPHASIS ON

S②; f_A = 300Hz, 30 % MOD,

Lch (or Rch) only, 54dB μ V

S③; f_A = 5kHz, 30 % MOD,

Lch (or Rch) only, 54dB μ V

Signal for trap adjustment

T①; 53.75MHz, unmodulated, 54dB μ V

T②; 59.75MHz, unmodulated, 54dB μ V

Note 1;

How to set the TEST mode.

- Short-circuit PLL TEST TP and GND in the VIDEO assembly. (Fig. 9-6-2)
- Disconnect the AC power cord from the AC outlet, then connect it again.

How to release the TEST mode.

- Release the short-circuit PLL TEST TP and GND in the VIDEO assembly.
- Disconnect the AC power cord from the AC outlet, then connect it again.

Video System

Step No.	Adjustment item	Input signal		Adjustment point	Adjustment procedure
		Video	Audio		
1	Adjacent audio trap	2 ch Ⓝ	T①	L302 (T)	Adjust TP-2 47.25MHz component to minimum level.
2	Audio trap	2 ch Ⓝ	T②	L303 (T)	Adjust TP-2 41.25MHz component to minimum level.
3	Synchronous detection	V①	S①	—	Short TP-4 to GND, and measure TP-7 voltage.
4				L310 (T)	Open TP-4, and adjust the TP-7 voltage to the voltage measured in step 3.
5	RF AGC			VR302 (T)	Adjust the TP-1 voltage to 6.5V.
6	AFT			L309 (T)	Adjust the TP-5 voltage to 4.5V.
7	VIDEO output			VR301 (T)	Adjust the output level of the OUTPUT REC (EXCEPT VIDEO 1) terminal on the rear panel to 1Vp-p when that terminal is terminated by 75 ohms.

Audio System

Step No.	Adjustment item	Input signal		Adjustment point	Adjustment procedure
		Video	Audio		
1	Audio detection	V①	S①	L312 (T)	Adjust the distortion of the AUDIO OUTPUT terminal on the rear panel to minimum level.
2	dbx filter	㊟	㊟	VR303 (T)	Input the signal of 22.9kHz/245mV to TP-10, and adjust TP-11 output to minimum.
3	VCO	㊟	㊟	—	Measure the DC voltage of TP-8 with no input signal.
4		㊟	㊟	VR304 (T)	Input the signal of 15.734kHz/48mV to TP-10, and adjust the DC voltage of TP-8 to the voltage measured in step 3.
5	Separation	V①	S②	VR305 (T)	Adjust the output of the AUDIO OUTPUT terminal on the rear panel to minimum level.
6			S③	VR306 (T)	
7	Repeat steps 5 and 6 to obtained best separation.				

9.2 WHEN TUNER ASSEMBLY IS REPLACED

- No adjustment required.

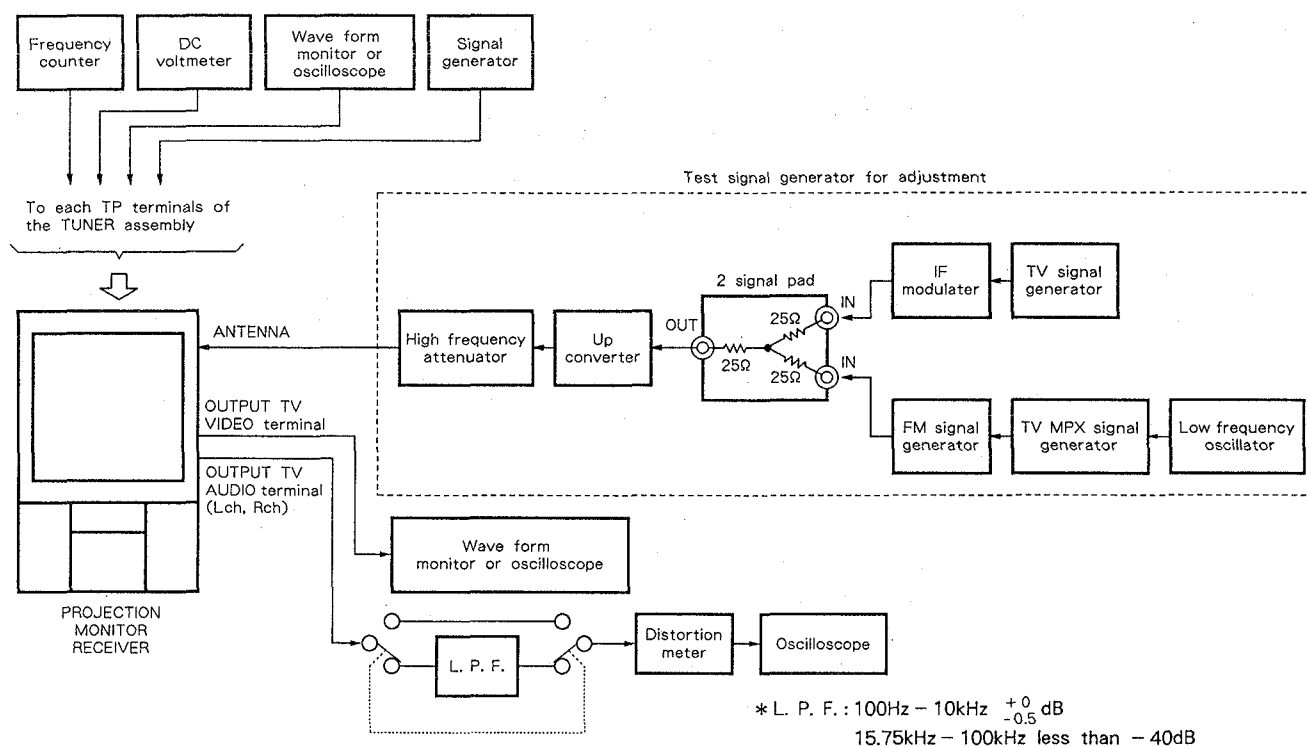


Fig. 9-1 Connection diagram when adjusting the tuner section

9.3 WHEN VIDEO ASSEMBLY IS REPAIRED

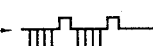
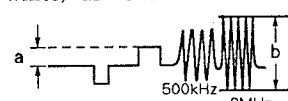
9.3.1 Video section

- Adjustment test points (TP) are located in the VIDEO assembly unless otherwise noted (Refer to Fig. 9-6-2).

Step No.	Adjustment item	Input signal	Adjustment point	Adjustment procedure
1	Comb filter adjustment	Color bar	VR101, L150 (V)	Adjust TP-01 3.58MHz component to minimum level.
2	White balance adjustment	Color bar signal without color signal	Screen VR (R),(B) (VR1)	Adjust the screen VRs (R) and (B) until grey color can just be seen in the color of dark area. (Do not move the green VR at this stage.)
			VR102 (R) Drive VR105 (B) VR (V)	Using the drive VR, adjust the color of bright area to white.

9.3.2 Microcomputer section

- Set to the FACTORY ADJ. MODE. (* 2)
- The * 1 mark in the adjustment description means that the corresponding adjustment should be effectuated with the remote control unit in the same way as the adjustment by the user.

Step No.	Adjustment item		Input signal	Adjustment point	Adjustment procedure
1	PIONEER Standard setting	Brightness adjustment	—	Color (* 1)	Minimize Color by remote control.
2			Cross hatch signal	Brightness (* 1)	Adjust the cut off level at TP-GK of G. CRT assembly to 190V. (After adjustment, confirm the white balance.) Cut off level (190V)  (After this adjustment, adjust color as described in step No. 4).
3		Sharpness adjustment	Multi burst	Sharpness (* 1)	At TP-05, set the rate of b (peak-to-peak value at 2MHz) to a (level from black to white) as follows. a : b = 3 : 9.5 (+ 10dB) 
4		Color adjustment	Color bar	Color (* 1)	Adjust screen to optimum condition.
5		Tint adjustment		Tint (* 1)	Adjust screen to optimum condition.
6		Contrast adjustment	—	Contrast (*1)	Adjust screen to optimum condition.
7			Free signal	—	At the TP-BK of B. CRT assembly, confirm that the signal is shaped as shown below.  Shapely wave form Shapeless wave form
8	Turn the FACTORY ADJ. MODE switch (S863) off to the normal mode. (* 2)				
9	Blue tailing adjustment	Cross signal	—	Adjust the SG output of the input cross signal to maximum level. Maximize contrast by remote control.	
			VR107 (V)	Turn VR107 fully counter clockwise (resulting in blue tailing.).	
				Turn the VR clockwise until there is no blue tailing at the vertical cross line on the screen.	
10	Press the FACTORY ADJ. MODE ON/OFF switch (S863) twice so that the test cross signal is reset to the default status. Pressing the switch twice will enter the FACTORY ADJ. MODE, and then the normal mode.				
11	Test cross H. center position	Signal with synchronizing signal meaning	TC201 (V)	Generate test cross signal, and adjust to center of screen.	
12	DPO level adjustment	This adjustment only needs to be carried out if IC205 (M6M80011AP) is replaced or if the DPO preset level is changed when a peripheral circuit is repaired. The adjustment procedure is described in Section 9.14.			

*1: Adjust by remote control.

*2: FACTORY ADJ. MODE ON/OFF

Press the FACTORY ADJ. MODE ON/OFF switch (S863) with a thin stick or a similar object through the center hole of the front panel. Press the switch once again, and the normal mode will be re-entered. (Refer to Fig. 9-7)

9.4 WHEN VIDEO ASSEMBLY IS REPLACED

9.4.1 Video section

- Adjust white balance adjustment as described in section 9.3.1.

9.4.2 Microcomputer section

- Perform PIONEER standard setting and blue tailing adjustment as described in section 9.3.2.

9.5 WHEN DEFLECTION ASSEMBLY IS REPAIRED

Note : VR552 thru VR555 are protected by the shield covers (ANH1213) so that they can not be adjusted. Do not try to turn these volumes by removing their shield cover. (Otherwise, the sensitivity of the protection circuit against the X-ray and the anode voltage will be affected.)

9.5.1 Power supply section

Step No.	Adjustment item	Input signal	Adjustment point	Adjustment procedure
1	135V power supply adjustment	Monoscope signal	VR651 (D)	Adjust TP652 voltage to $135V \pm 1V$.

9.5.2 Deflection section

● Adjustment test points (TP) are located in the DEFLECTION assembly.

Step No.	Adjustment item	Input signal	Adjustment point	Adjustment procedure
1	Focus adjustment	Cross hatch signal	Focus VR (VR)	Optimize the focus of each CRT assembly. (Focus is easier to judge if red and blue are displaced by turning the convergence controls on the remote control as shown in Fig. 9-7. Readjust these controls to their original positions after completing the focus adjustment.)
2	Vertical size adjustment	Monoscope signal or ordinary broadcasting	VR601 (V)	Adjust to $92\% \pm 2\%$ when using the monoscope signal, and adjust so that the screen picture does not lack any part of the entire picture field when using the ordinary broadcasting.
3	Horizontal size adjustment		VR551 (D)	
4	White balance adjustment	Ordinary broadcasting	Screen (VR1) (R) (G) (B)	Adjust the white if proper adjustment cannot be achieved as follows. Set the COLOR by the remote control to minimum, adjust the screen VRs to obtained best picture.

9.6 WHEN DEFLECTION ASSEMBLY IS REPLACED

Note : As VR552 thru VR555 in the DEFLECTION assembly supplied as a spare part are not protected by the shield cover (ANH1213), do the followings :

1. When ordering the DEFLECTION assembly, also order the shield cover.
2. Cover VR552 thru VR555 of the DEFLECTION assembly with the shield cover and solder the top position as shown below. (Never turn VR552 thru VR555.)

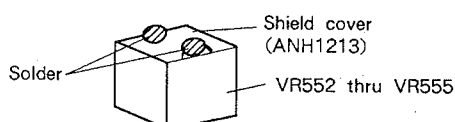


Fig. 9-2 Shield cover

9.6.1 Power supply section

● No adjustment required.

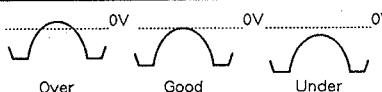
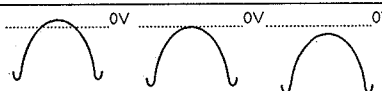
9.6.2 Deflection section

● Adjust focus, vertical size, horizontal size and white balance as described in section 9.5.2.

9.7 WHEN CONVERGENCE ASSEMBLY IS REPAIRED OR REPLACED

- Adjust convergence as described in section "9.7.2 CONVERGENCE ADJUSTMENT".
- Press the FACTORY ADJ. MODE ON/OFF switch (S863) twice before adjustment. Pressing the switch twice will enter the FACTORY ADJ. MODE, and then the normal mode before adjustment.

9.7.1 PARABOLA WAVEFORM TOP LEVEL ADJUSTMENT

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	TOP LEVEL OF H PARABOLA WAVEFORM	VR701	At TP702, set the top level of output waveform to $0V \pm 20mV$. 
2	TOP LEVEL OF V PARABOLA WAVEFORM	VR702	At TP701, set the top level of output waveform to $0V \pm 20mV$. 

9.7.2 CONVERGENCE ADJUSTMENT

- Picture movement and adjustment points are summarized in Fig. 9-3 and 9-4.
- Adjustment points are located in the CONVERGENCE assembly except POSITION control. Also adjust the POSITION by remote control.
- Input signal is the cross-hatch signal.
- Convergence adjustment outline is referred to the Service manual SD-P401/KUX1C (ARP1455), and SD-P40/KU (ARP-977-0), except for H-S-PIN and H-S-LIN adjustments.
- After performed all adjustment, release the short-circuit to obtained white screen and perform the pre-adjustment.
- Correct the vertical line by horizontal correcting signal and correct the horizontal line by vertical correcting signal.

(1) GREEN LINE ADJUSTMENT

- Since the green lines are used as a reference when adjusting red and blue, make sure it is adjusted accurately.
- Short-circuit TP-47R, TP-47B and +12V TP in the VIDEO assembly, then green lines appear in the screen. Release the short-circuit after green line adjustment.

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	GH – PIN	VR703	Adjust the green line to a straight line (refer to Fig. 9-3 and 9-4).
2	GH – KEY	VR704	
3	GV – BOW	VR705	
4	GV – KEY	VR706	
5	GV – S – KEY	VR707	
6	GV – PIN	VR708	
7	Repeat steps 1 thru 6 until the best possible picture is obtained.		

Note : * 1

POSITION adjustment is possible when PRESET MENU switches (S875, S870) are pushed, and CONVERGENCE mode of MENU is set. Since CROSS TEST signal is displayed forcibly in the case of CONVERGENCE mode, adjust with this signal. (Refer to page 16 of Operating Instructions with this Service Manual.) After finishing the POSITION adjustment, set the MENU switch to off.

(2) RED LINE ADJUSTMENT

- Short-circuit TP-47B and +12V TP, then green lines and red lines appear in the screen. Release the short-circuit after red line adjustment.
- Adjust each VR so that the red lines converge with the green lines to obtain yellow lines.
- After adjustment, perform fine-adjustment by observing the overall screen.

● Red horizontal distortion compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	RH-SKEW	VR709	Adjust the red vertical lines in the center of the screen to straight lines without distortion and lean. (Refer to Fig. 9-3.)
2	RH-BOW	VR710	
3	Repeat steps 1 and 2.		
4	RH-KEY	VR711	Adjust the red vertical lines in the right and left section of the screen to straight lines without lean. (Refer to Fig. 9-3.)
5	RH-S-KEY	VR712	
6	Repeat steps 4 and 5.		
7	RH-PIN	VR713	Adjust the red vertical lines in the right and left sections of the screen to straight lines without distortion. (Refer to Fig. 9-3.)
8	RH-S-PIN	VR714	
9	Repeat steps 7 and 8 or steps 1 thru 8.		

● Red horizontal interval compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	RH-POSITION	* 1 Keys 4, 5 and 6 of remote control	Adjust so that the red vertical lines converge with the green vertical lines in the center of the screen to obtain yellow lines. (This serves as the reference setting, but if the lines diverge during the adjustment, proceed with the adjustment after considering this divergence.)
2	RH-LIN	VR715	Adjust so that the red vertical lines converge with the green vertical lines in the right and left sections of the screen to obtain yellow lines. (Refer to Fig. 9-3)
3	RH-S-LIN	VR716	
4	RH-SIZE	VR717	
5	Repeat steps 1 thru 4.		

● Red vertical distortion compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	RV-SKEW	VR718	Adjust the red horizontal lines in the center of the screen to straight lines without distortion and lean. (Refer to Fig. 9-4.)
2	RV-BOW	VR719	
3	Repeat steps 1 and 2.		
4	RV-KEY	VR720	Adjust the red horizontal lines in the lower and upper sections of the screen to straight lines without lean. (Refer to Fig. 9-4.)
5	RV-S-KEY	VR721	
6	RV-PIN	VR722	
7	Repeat steps 4 thru 6 or steps 1 thru 6.		

● Red vertical interval compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	RV-LIN	VR723	Adjust so that the red horizontal lines converge the green horizontal lines in the center of the screen to obtain yellow lines. (This serves as the reference setting, but if the lines diverge during the adjustment, proceed with the adjustment after considering this divergence.) (Refer to Fig. 9-4.)
2	RV-POSITION	* 1 Keys 2, 5 and 8 of remote control	
3	RV-SIZE	VR724	Adjust so that the red horizontal lines converge the green horizontal lines in the lower and upper sections of the screen to obtain yellow lines. (Refer to Fig. 9-4.)
4	Repeat steps 1 thru 3.		

* 1 : See page 70.

(3) BLUE LINE ADJUSTMENT

- Short-circuit TP-47R and +12V TP, then green lines and blue lines appear in the screen. Release the short-circuit after blue line adjustment.
- Adjust each VR so that the red lines converge with the green lines to obtain cyan lines.
- After adjustment, perform fine-adjustment by observing the overall screen.

● Blue horizontal distortion compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	BH-SKEW	VR725	Observe the blue vertical lines in the screen, and adjust in the same way as the red horizontal distortion compensation adjustment.
2	BH-BOW	VR726	
3	BH-KEY	VR727	
4	BH-S-KEY	VR728	
5	BH-PIN	VR729	
6	BH-S-PIN	VR730	

● Blue horizontal interval compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	B-H-POSITION	* 1 Keys 4, 5 and 6 of remote control	Adjust so that the blue lines converge with the green lines to obtain cyan lines in the same way as the red horizontal interval compensation adjustment. However, BH-S-LIN movements are reversed on the left and right sides of RH-S-LINE. The main points of BH-LIN and BH-S-LIN are reversed on the left and right sides of RH-LIN and RH-S-LIN.
2	BH-LIN	VR731	
3	BH-S-LIN	VR732	
4	BH-SIZE	VR733	

● Blue vertical distortion compensation adjustment

Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	BV-SKEW	VR734	Observe the blue horizontal lines in the screen, and adjust in the same way as the red vertical distortion compensation adjustment.
2	BV-BOW	VR735	
3	BV-KEY	VR736	
4	BV-S-KEY	VR737	
5	BV-PIN	VR738	

● Blue vertical interval compensation adjustment

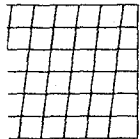
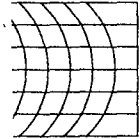
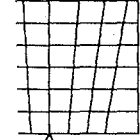
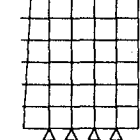
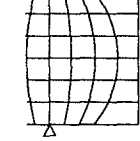
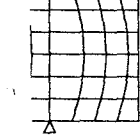
Step No.	Adjustment item	Adjustment point	Adjustment procedure
1	BV-LIN	VR739	Adjust so that the blue lines converge with the green lines to obtain cyan lines in the same way as the red vertical interval compensation adjustment.
2	BV-POSITION	* 1 Keys 2, 5 and 8 of remote control	
3	BV-SIZE	VR740	

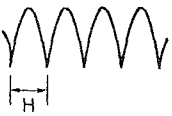
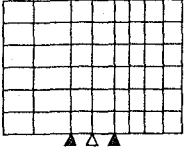
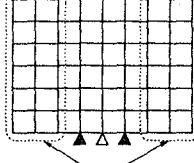
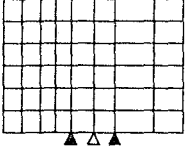
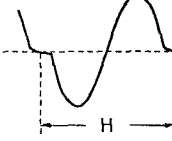
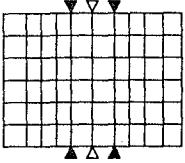
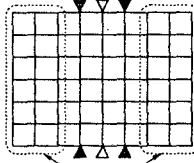
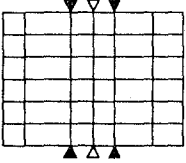
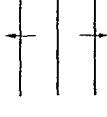
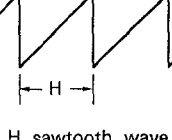
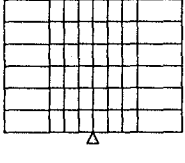
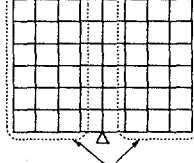
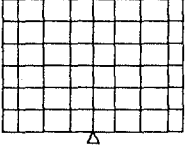
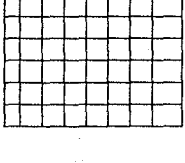
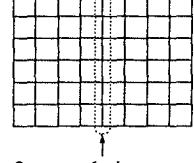
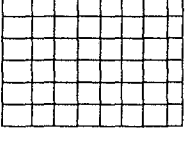
* 1: See page 70.

Compensation	Signal and mark * 1	Compensating signal	Distorted screen	Corrected screen	Distorted screen	Adjustment point	
Vertical distortion compensation	V - SKEW 	 H sawtooth wave		 Attention point		Observe the horizontal lines in the center of the screen (where there is no V - KEY, V - S - KEY, V - PIN nor V - S - PIN movement), then adjust the horizontal lines to eliminate lean.	To obtain the best possible lines, adjust the horizontal lines in the center of the screen following the adjustment procedure of V - SKEW and V - BOW.
	V - BOW 	 H parabolic wave		 Attention point		Observe the horizontal lines in the center of the screen, then adjust the bowed lines to straight lines.	
	V - KEY 	 V sawtooth wave x H sawtooth wave		 Attention point		Observe the horizontal lines in the lower section of the screen (where there is no V - S - KEY movement), then adjust the horizontal lines to eliminate lean.	To eliminate lean, adjust the horizontal lines in the upper and lower sections of the screen following the adjustment procedure of V - KEY and V - S - KEY.
	V - S - KEY 	 1/2 V sawtooth wave x H sawtooth wave		 Attention point		Observe the horizontal lines in the upper section of the screen, then adjust the horizontal lines to eliminate lean.	
	V - PIN 	 V sawtooth wave x H parabolic wave		 Attention point Attention point		Observe the horizontal lines in the upper and lower sections of the screen, then adjust the bowed lines to straight lines.	

Compensation	Signal and mark * 1	Compensating signal	Distorted screen	
Vertical interval compensation	* 2 V - LIN 	 V parabolic wave		At
	V - S - LIN			No adjust
	V - SIZE 	 V sawtooth wave		
	V - POSITION	DC voltage		C

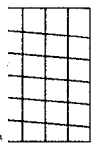
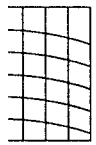
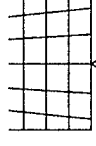
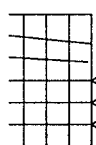
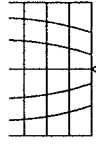
Fig. 9-4 Vertical compensation

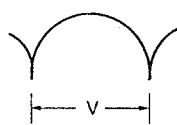
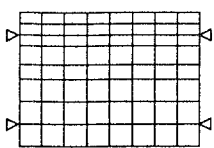
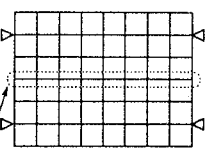
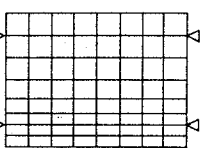
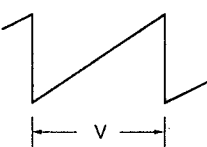
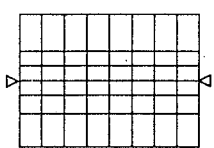
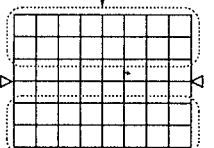
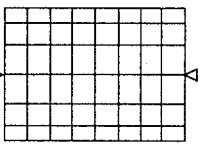
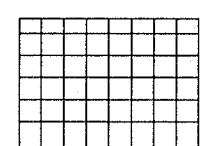
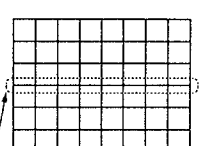
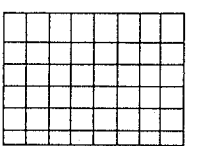
Distorted screen		Adjustment point	
	Observe the vertical lines in the center of the screen (where there is no H-KEY, H-S-KEY, H-PIN nor H-S-PIN movement), then adjust the vertical lines to eliminate lean.	To obtain the best possible lines, adjust the vertical lines in the center of the screen following the adjustment procedure of H-SKEW and H-BOW.	
	Observe the vertical lines in the center of the screen, then adjust the bowed lines to straight lines.		
	Observe the vertical lines in the right section of the screen (where there is no H-S-KEY nor H-S-PIN movement), then adjust the vertical lines to eliminate lean.	To eliminate lean, adjust the vertical lines in the right and left sections of the screen following the adjustment procedure of H-KEY and H-S-KEY.	
	Observe the vertical lines in the left section of the screen, then adjust the vertical lines to eliminate lean.		
	Observe the vertical lines in the right and left sections of the screen, then adjust the bowed lines to symmetrize the right and left by H-S-PIN. And adjust the bowed vertical lines in the right and left sections of the screen to straight lines by H-PIN.	To eliminate distortion, straighten the vertical lines in the right and left sections of the screen following the adjustment procedure of H-PIN and H-S-PIN.	
			

Compensation	Signal and mark * 1	Compensating signal	Distorted screen	Corrected screen	Distorted screen	Adjustment point	
Horizontal interval compensation	H-LIN 	H parabolic wave 		 Attention point		Adjust following the adjustment procedure of H-LIN and H-S-LIN (remember the degree of H-SIZE movement) so that the interval between vertical lines on the right section is the same as on the left section, with a central point which does not move. For example, when the vertical lines in the right section of the screen are moved to right direction, move the vertical lines in the left section of the screen as same degree as the gap in the right section to the left direction.	The vertical lines in the center of the screen converge into the green lines by H-POSITION. And also, the vertical lines in the right and left sections of the screen converge into the green lines by H-LIN, H-S-LIN and H-SIZE.
	H-S-LIN 			 Attention point			
	H-SIZE 	H sawtooth wave 		 Attention point		Converge the vertical lines in the right and left sections of the screen to green lines.	
	H-POSITION 	DC voltage		 Center of the screen		The vertical lines of the screen move parallel on the right and left by the convergence control of the remote control. When the vertical line moves at will, consider the degree of movement.	

Note: KEY is short for KEYSTONE, and LIN for LINEARITY
▽: denotes points which do not move
▼: denotes points which hardly move
* 1: Sketch is printed on the p.c. board.

Fig. 9-3 Horizontal compensation

screen	Adjustment point	
	Observe the horizontal lines in the center of the screen (where there is no V - KEY, V - S - KEY, V - PIN nor V - S - PIN movement), then adjust the horizontal lines to eliminate lean.	To obtain the best possible lines, adjust the horizontal lines in the center of the screen following the adjustment procedure of V - SKEW and V - BOW.
	Observe the horizontal lines in the center of the screen, then adjust the bowed lines to straight lines.	
	Observe the horizontal lines in the lower section of the screen (where there is no V - S - KEY movement), then adjust the horizontal lines to eliminate lean.	To eliminate lean, adjust the horizontal lines in the upper and lower sections of the screen following the adjustment procedure of V - KEY and V - S - KEY.
	Observe the horizontal lines in the upper section of the screen, then adjust the horizontal lines to eliminate lean.	
	Observe the horizontal lines in the upper and lower sections of the screen, then adjust the bowed lines to straight lines.	To eliminate distortion, straighten the horizontal lines in the upper and lower sections of the screen following the adjustment procedure of V - PIN and V - S - PIN.

Compensation	Signal and mark * 1	Compensating signal	Distorted screen	Corrected screen	Distorted screen	Adjustment point		
Vertical interval compensation	* 2 V - LIN	 V parabolic wave		 Attention point		Converge the horizontal lines in the center of the screen into green lines. At this time, be sure to the same horizontal line interval as upper section as lower section about a central point. However, if the same interval is not to obtained, adjust POSITION and adjust V - LIN again.	The horizontal lines in the center of the screen converge into the green line by V - LIN and V - POSITION. And also the horizontal lines in the upper and lower sections of the screen converge into the green line by V - SIZE.	
	V - S - LIN	No adjustment						
	V - SIZE	 V sawtooth wave		 Attention point		Converge the horizontal lines in the upper and lower sections of the screen into green lines.		
	V - POSITION	DC voltage		 Center of the screen		The horizontal lines of the screen move parallel on the upper and lower by the convergence control of the remote control. When the horizontal line moves at will, consider the degree of movement.		

Note: KEY is short for KEYSTONE, and LIN for LINEARITY.
 ▽: denotes points which do not move.
 * 1: Sketch is printed on the P.C. board.
 * 2: The movement of V - LIN is the same as the SD - P40/KU.

Fig. 9-4 Vertical compensation

9.8 WHEN FRONT CONTROL ASSEMBLY IS REPAIRED

Step No.	Adjustment item	Input signal	Adjustment point	Adjustment procedure
1	DPO sensitivity adjustment	Adjust DPO sensitivity adjustment as described in section 9.15.		

9.9 WHEN FRONT CONTROL ASSEMBLY IS REPLACED

- No adjustment required.

9.10 WHEN R, G, OR B CRT ASSEMBLY IS REPAIRED OR REPLACED

- White balance should require very little adjustment, but if necessary, adjust as described in Section "9.5 When DEFLECTION assembly is repaired".

9.11 WHEN CRT ASSEMBLY R, G, OR B IS REPLACED

- The CRT assembly R, G, B replacement procedure is described in Section "10. Replacing the CRT assembly".
- When one or two tubes are replaced, match the new tubes with the remaining tube. If all three tubes are replaced, first adjust G, and then match the other two tubes with the G tube.

Step No.	Adjustment item	Input signal	Adjustment point	Adjustment procedure
1	Deflection yoke angle and centering adjustment	Cross signal (or apply any signal, and set PRESET MENU switches S875 and S870 to generate a cross test signal)	Centering magnet of deflection yoke of replaced CRT assembly (Refer to Fig. 9-8)	Adjust the deflection yoke angle until the color cross of the replaced CRT assembly is parallel with the color cross of a CRT assembly which has not been replaced. Turn the convergence control to the center position when the red or blue CRT assembly is replaced. Press the FACTORY ADJ MODE ON/OFF switch (S863) twice so that the test cross signal is reset to the default status. Pressing the switch twice will enter the FACTORY ADJ MODE, and then the normal mode. Adjust the centering magnet of the deflection yoke in the replaced CRT assembly until cross becomes converge.
2	Focus adjustment	Cross hatch	Replaced color focus VR (VR1) and lens assembly connected to replaced CRT assembly (Refer to Fig. 9-7 and Fig. 9-9)	Adjust the focus of the replaced CRT assembly to optimum condition. (The focus is easier to see if red and blue are displaced by turning the convergence control of remote control at this time. But remember to turn the knob back after completing the adjustment.)
3	Convergence adjustment		Match the color convergence of the replaced CRT assembly with the color an assembly which has not been replaced. See Section 9.7.2 CONVERGENCE ADJUSTMENT for details on the matching procedure. (When CRT assembly G is replaced, match the color convergence of the R, G and B.)	
4	White balance	Color bar signal without color signal	Screen VR (VR1) VR102 (R) } Drive VR VR105 (B) } (V)	Set standard values "0" by remote control unit. Adjust the replaced color screen VR until grey can be seen in the color of dark area. Adjust the replaced color drive VR until the color of bright area becomes white. (When CRT assembly G is replaced, slightly adjust the drive VR [R] and [B].) Adjust the PIONEER Standard brightness only when the above adjustments have not been successfully effectuated due to the abnormal brightness.
5	PIONEER standard settings	Adjust as described in steps 1 thru 7 in Section 9.3.2.		

9.12 WHEN LENS ASSEMBLY IS REPLACED

- Remove the lenticular sheet, and attach tracing paper with a plastic tape, etc. instead. (Refer to Fig. 9-9.) Adjust the focus of the lens assembly newly mounted, by observing the picture shown on the tracing paper.

9.13

- No

9.14

The section the le switch. PROJ (cont Altho condi becon enviro qualiti (IC2C Hence replac qualiti Refer Instru

9.13 WHEN OTHER ASSEMBLIES ARE REPAIRED OR REPLACED

- No adjustment required.

9.14 DPO LEVEL SETTING

The DPO function features a DPO light-sensitive section in the front control panel designed to judge the level of external light when the front panel DPO switch (S872) is ON, thereby matching the PROJECTION MONITOR RECEIVER picture quality (contrast, color, bright) with the external light.

Although picture quality is standard under bright conditions, the quality is changed if the environment becomes dark, and is changed to a fixed level if the environment becomes completely dark. This picture quality level is stored in a non-volatile memory (IC205).

Hence, if IC205 (or peripheral circuits) is repaired or replaced, or if VIDEO assembly is replaced, picture quality must be stored in IC205 again.

Refer to page 23 ("DPO ADJUSTMENT") of Operating Instructions with this Service Manual.

The picture quality set in step (2) is thus stored in memory. The default values set prior to shipment from the factory are given below for reference.

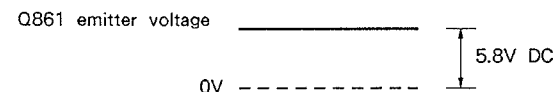
Contrast	- 18
Color	- 3
Bright	+ 4

Note: Values subject to possible modification without notice, due to improvements.

9.15 DPO SENSITIVITY ADJUSTMENT

The sensitivity of the DPO light-sensitive section is adjusted to determine the level of external light at which the DPO feature is activated. This adjustment is made by VR861 in the FRONT CONTROL assembly (refer to Fig. 9-6), and should be carried out according to the customer's preferences. The adjustment procedure used at the factory is given for reference.

- (1) Using an incandescent light bulb as the light source, light is beamed directly into the DPO light sensitive section with a light-intensity level of 50 lux at the DPO.
- (2) Switch the DPO switch (S872) on. "DPO ON" indicate in the screen.
- (3) FRONT CONTROL assembly VR861 is adjusted to obtain a voltage of 5.8V ($\pm 0.1V$) at the Q861 emitter.



Note: Values subject to possible modification without notice, due to improvements.

9.16 ANODE CABLE CONNECTION AND DISCONNECTION

SERVICEMAN WARNING

High voltage (31.8kV) will remain at anode of the picture tube for a long period after turning power off even more than one or two weeks.

In this state, it will be really dangerous if any kind of operation which has a risk of electric shock at anode is carried out; such as replacement of the picture tube (CRT assembly R, G, B) or exchanging and removing an anode cable.

When these kinds of operations are required, be sure to discharge anode voltage following the procedure of "Discharge of anode voltage", page 6.

Disconnect the FBT anode cable as outlined in Fig. 9-5. Confirm the extension of the rubber cover before disconnecting the cable, then it is easy to connect the anode cable after the anode voltage is measured. When connecting the anode cable, proceed in the reverse order as mentioned above. Confirm that the cable will not come off by pulling it after the cable is connected.

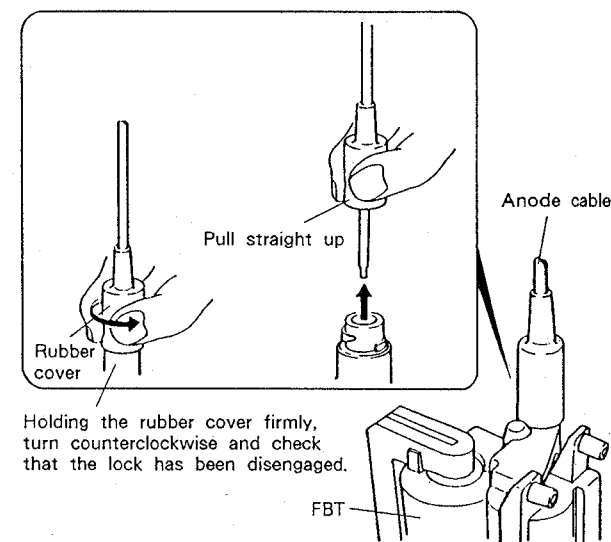


Fig. 9-5 Disconnecting the anode cable

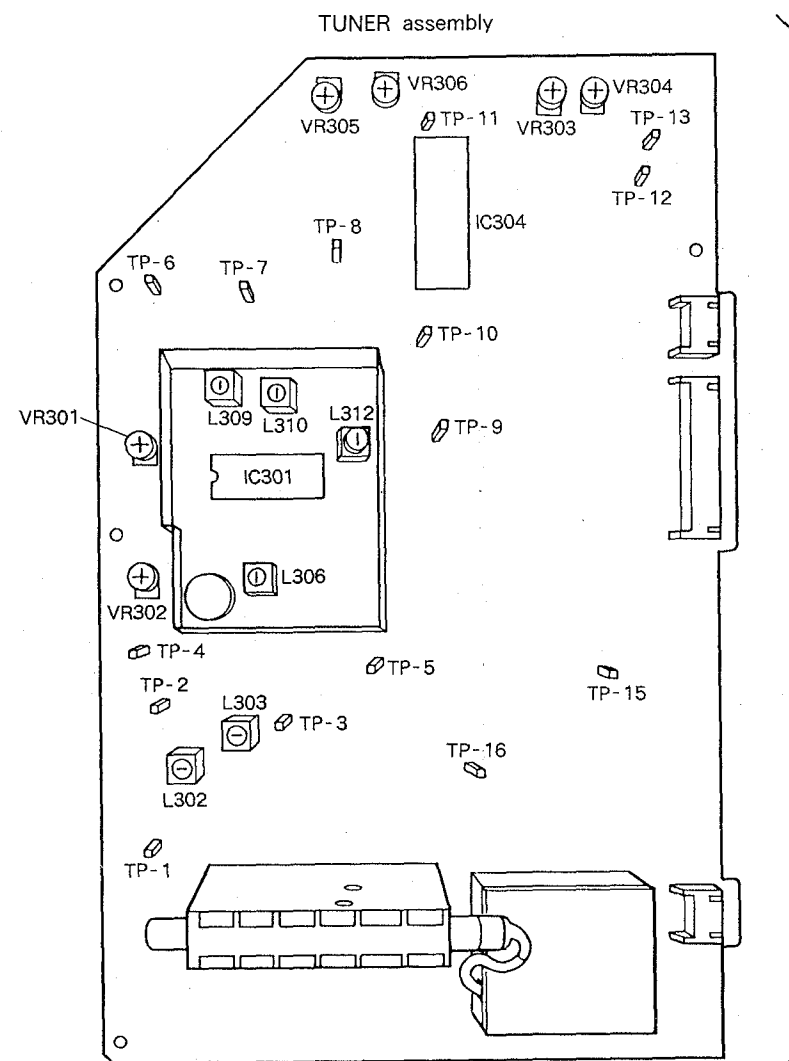


Fig. 9-6-1

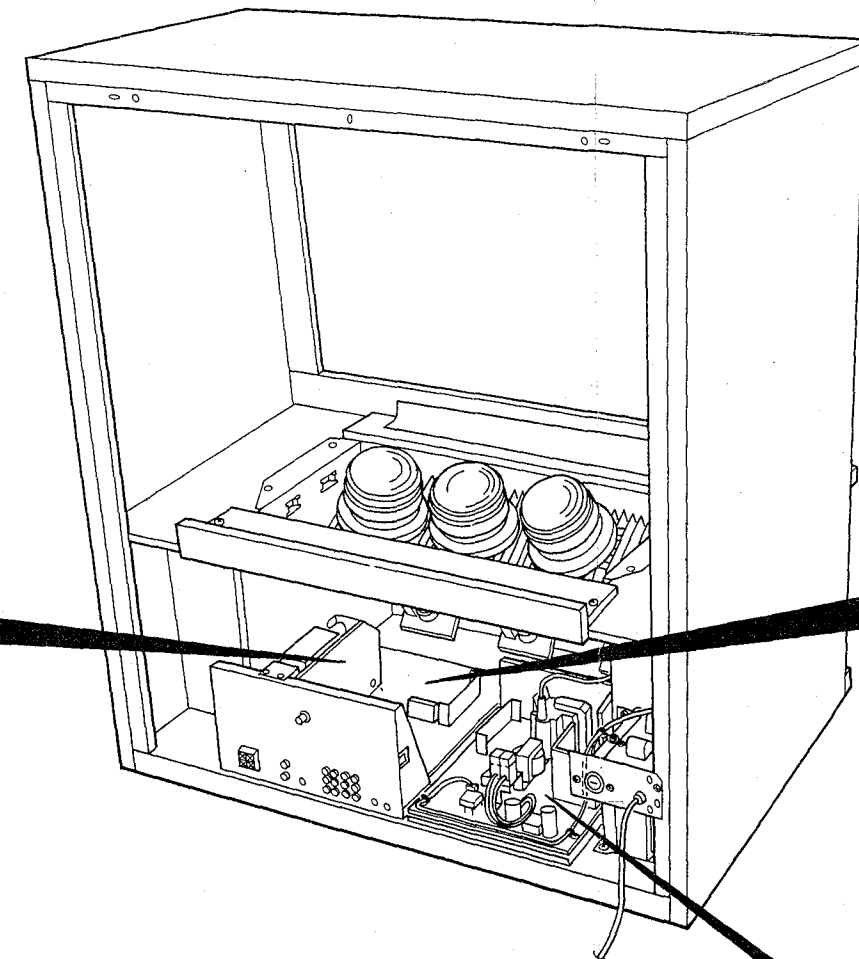


Fig. 9-6 Adjustment point (1)

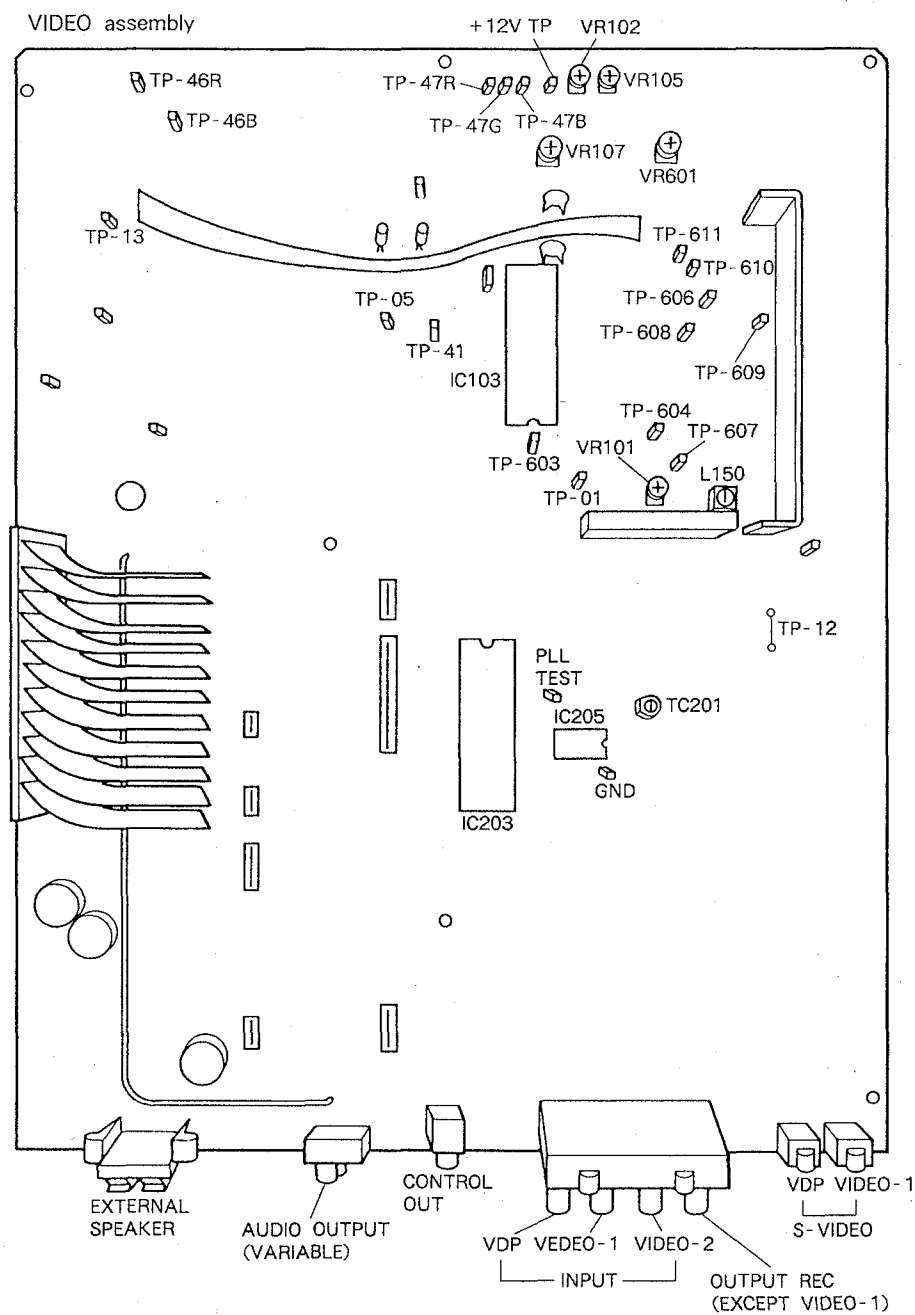
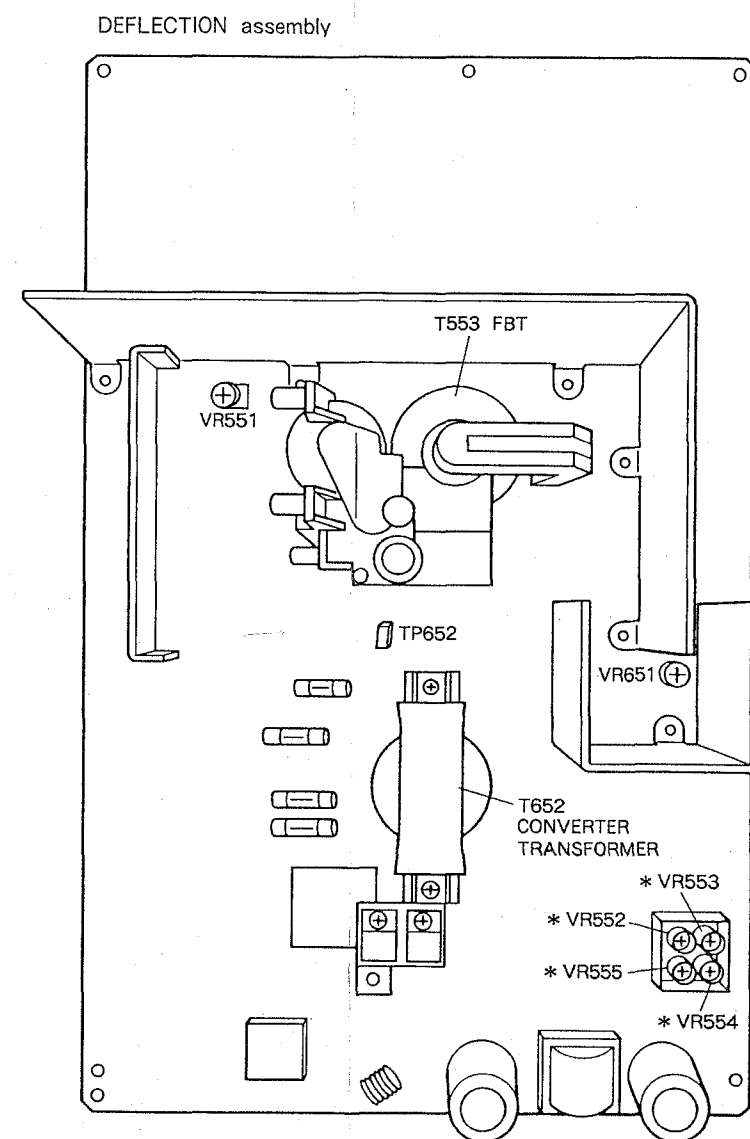
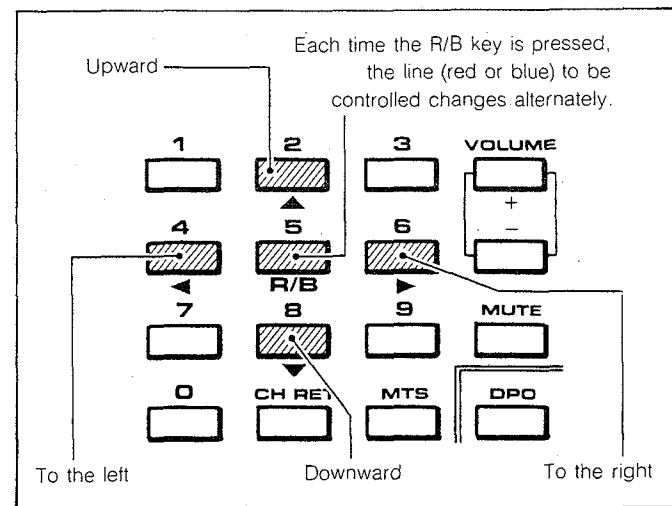


Fig. 9-6-2



Note: Do not turn VR552 thru VR555 (*)

Fig. 9-6-3



REMOTE CONTROLLER KEY FUNCTION FOR CONVERGENCE

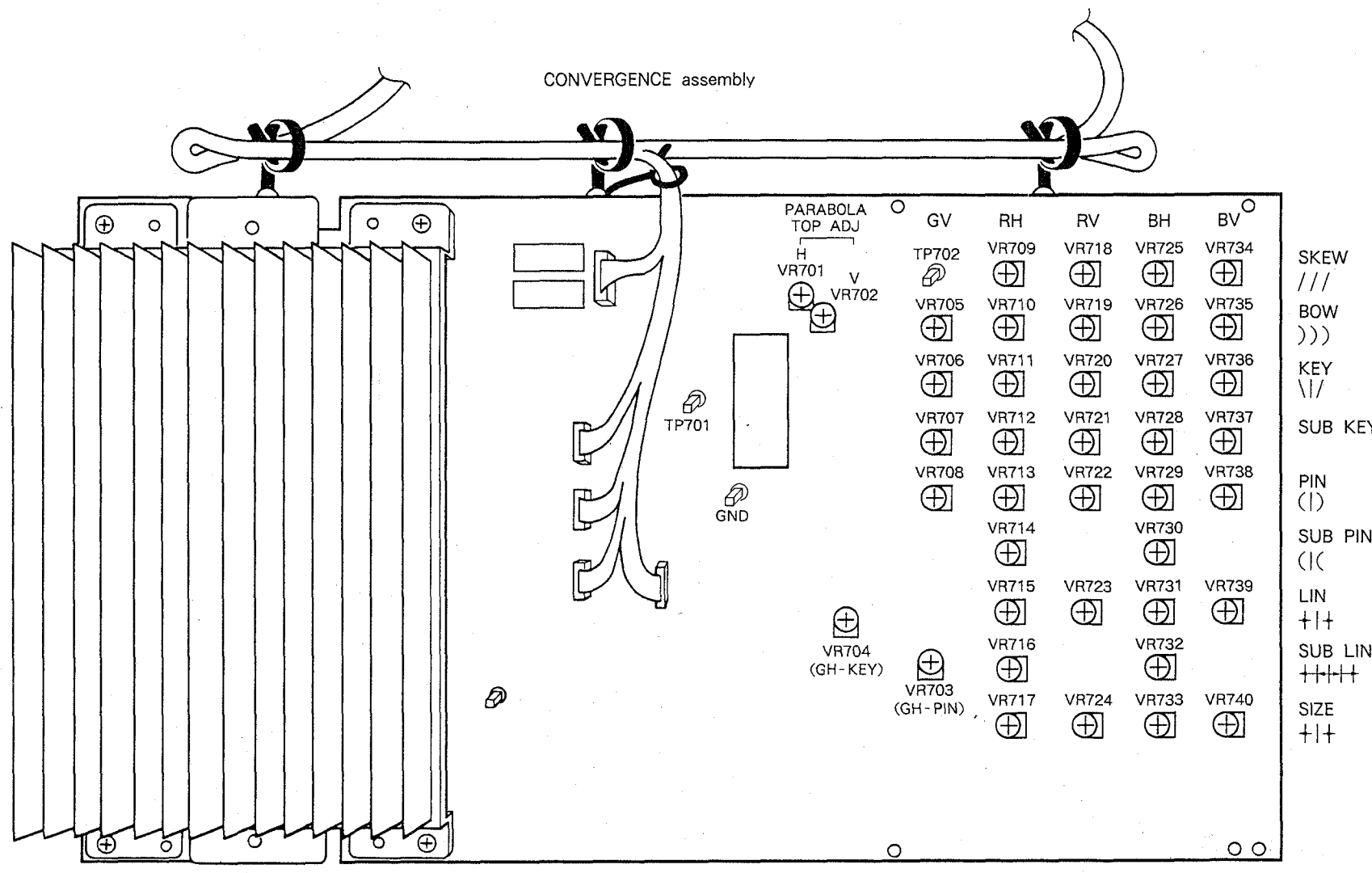
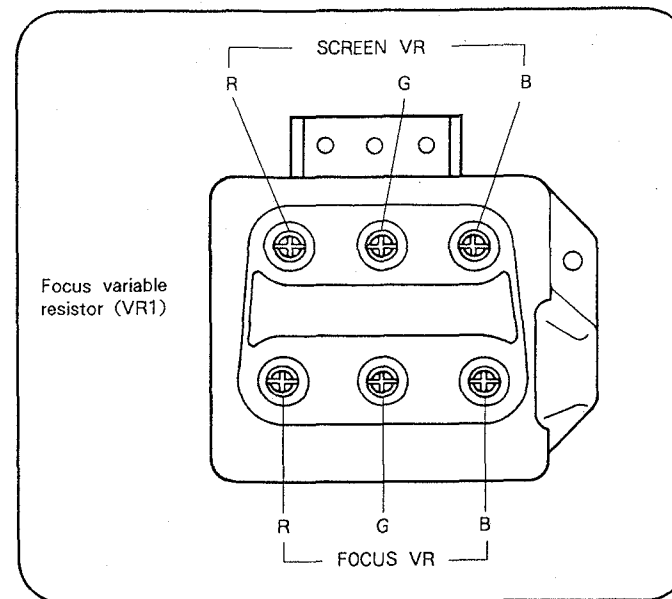
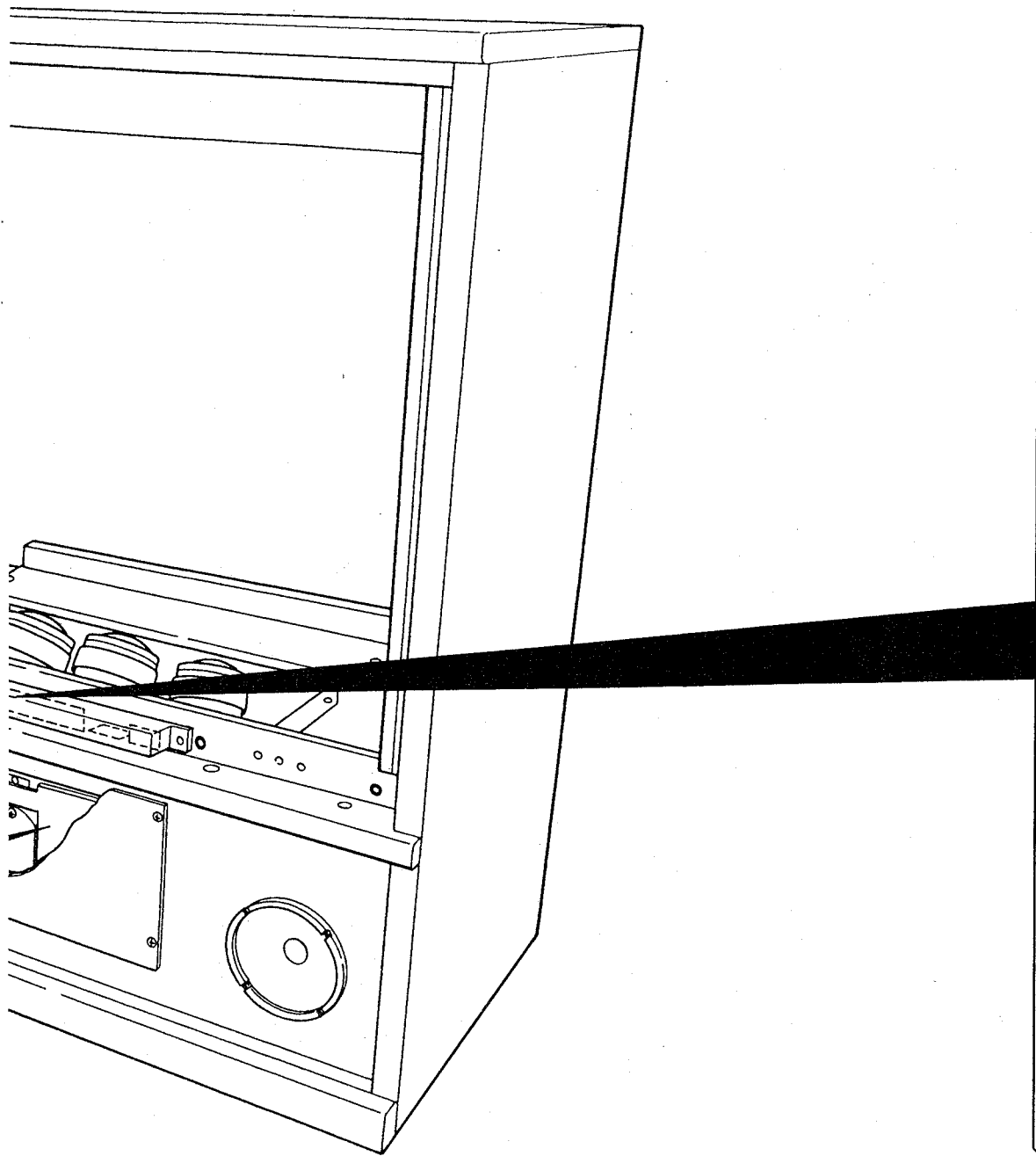
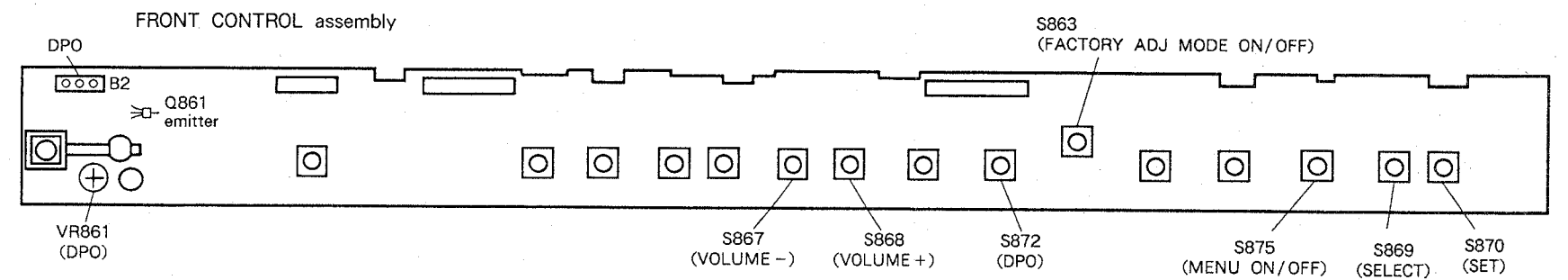
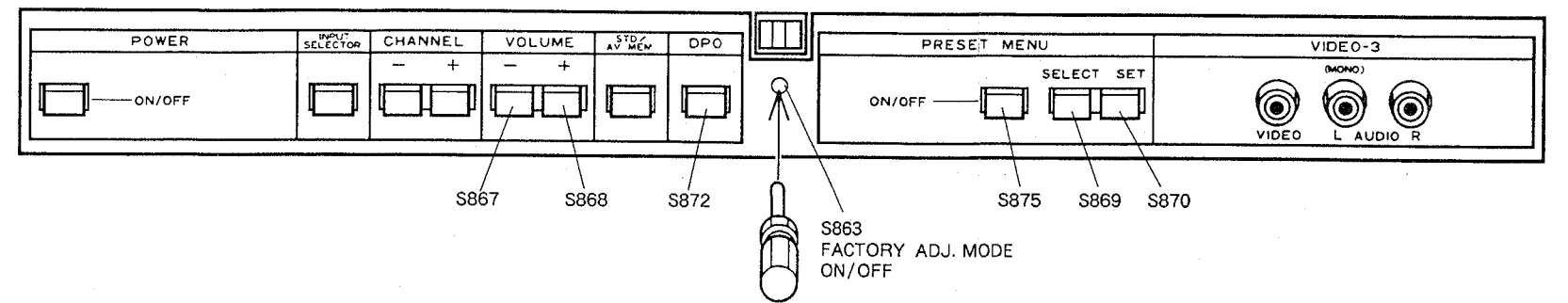


Fig. 9-7 Adjustment point (2)



● Front panel



istment point (2)

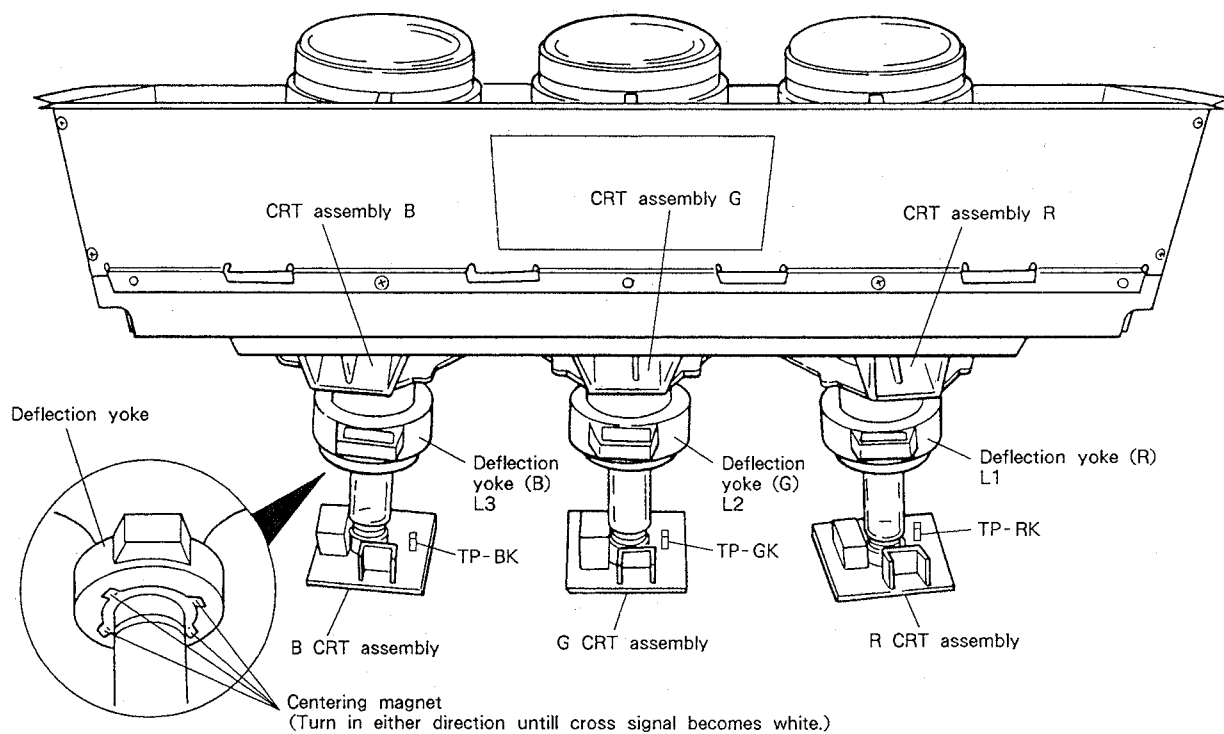


Fig. 9-8 Adjustment point (3)

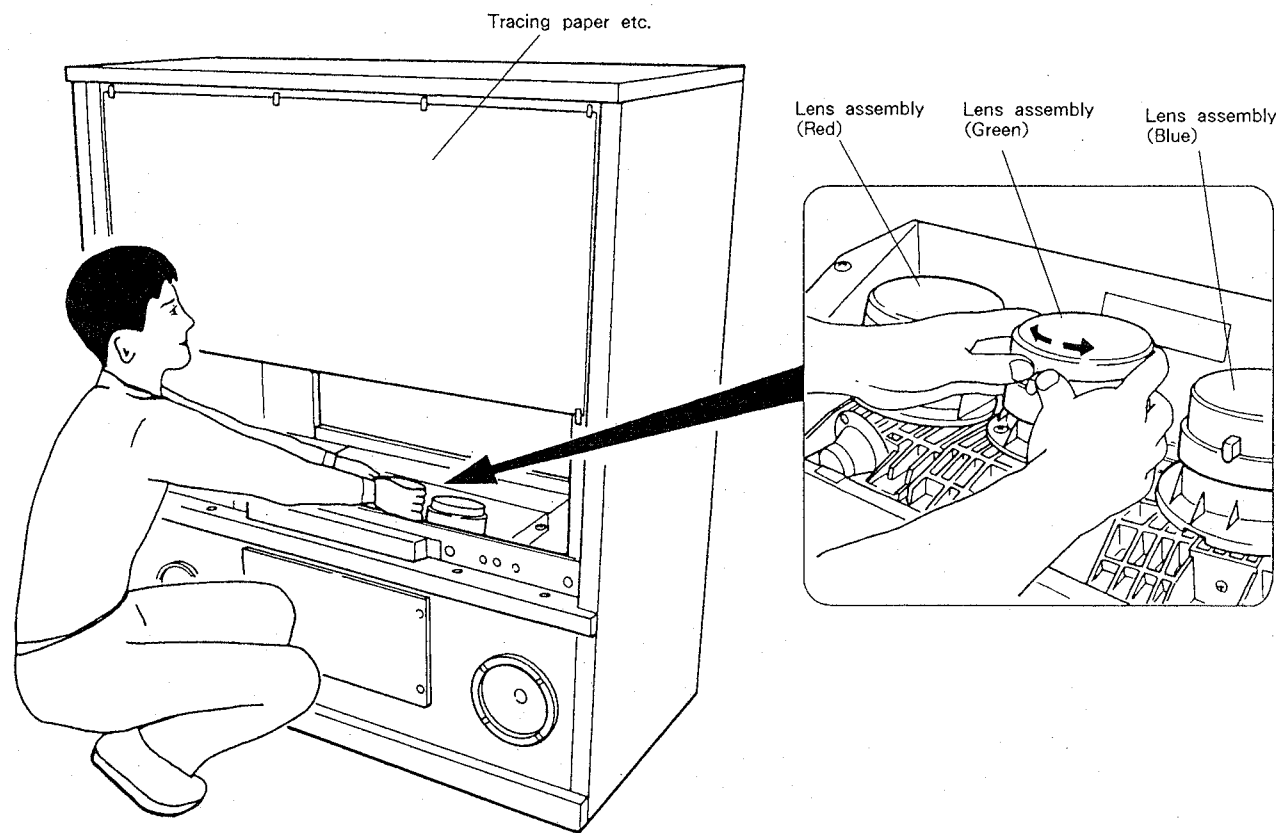


Fig. 9-9 Adjustment point (4)

10. REPLACING THE CRT ASSEMBLY

Serviceman Warning

High voltage (31.8kV) will remain at anode of the picture tube for a long period after turning power off even more than one or two weeks.
In this state, it will be really dangerous if any kind of operation which has a risk of electric shock at anode is carried out; such as replacement of the picture tube (CRT assembly R, G, B) or exchanging and removing an anode cable.
When these kinds of operations are required, be sure to discharge anode voltage following the procedure of "Discharge of anode voltage", page 6.

The anode cables of the CRT assembly R, G, and B in PROJECTION MONITOR RECEIVER are connected in series as shown in Fig. 10-1.
When replacing the CRT assembly, the anode cable have to be cut.
Note: Since the anode cables for the CRT assembly to service supplies are only available in half lengths, either cut longer lengths, or join older lengths of cable to ensure that the original cable length is used.

Table 10-1 Cable disconnecting methods

Cable	Replacement CRT assembly		
	When CRT assembly B is replaced	When CRT assembly G is replaced	When CRT assembly R is replaced
Cable (a)			Disconnect the anode cable from the FBT. (Refer to section "9.16 Anode cable connection and disconnection".)
Cable (b)	Leave as is	Cut a place 20mm from the exact center towards the CRT assembly G	Cut a place 20mm from the exact center towards the CRT assembly R
Cable (c)	Cut a place 20mm from the exact center towards the CRT assembly B	Cut a place 20mm from the exact center towards the CRT assembly G	Leave as is

Note: Do not cut other cables by mistake.

10.1 WHEN REPLACING THE CRT ASSEMBLY

Perform the replacement after discharged the anode voltage as described in section "4. Discharge of anode voltage".

Each CRT assembly supplied as a spare part is as shown below.

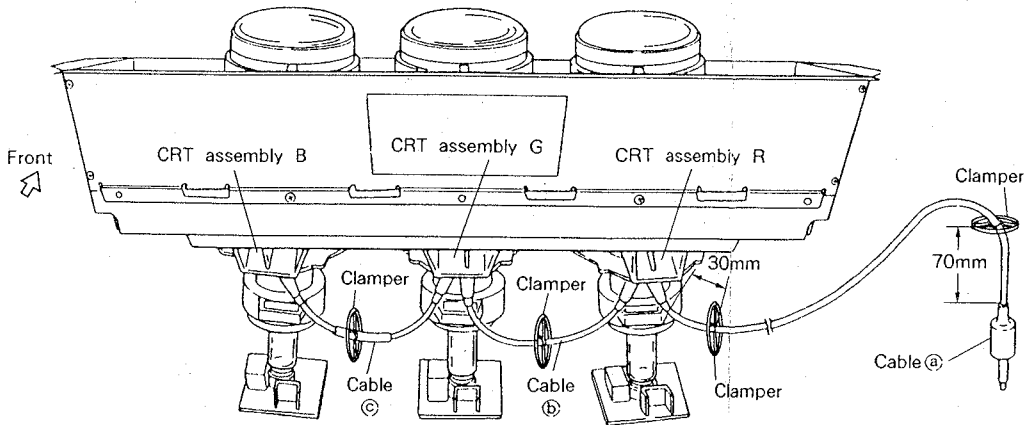
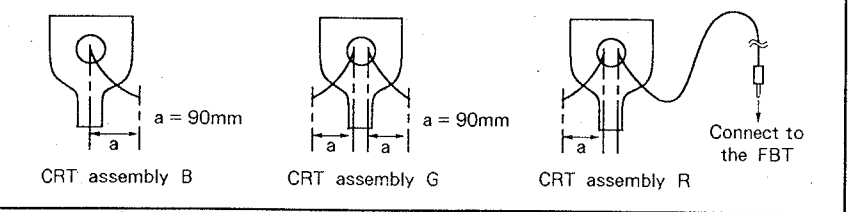


Fig. 10-1 Connection diagram of the each CRT assemblies

10.2 ANODE C

- Peel the sheath of new anode cable
- The anode cable 2. Note that the
- The method use illustrated in Fig. care not to dam

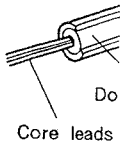


Fig. 10-2

10.3 ANODE C

- Join the cut anode to restored as s replacing the FB cable connection
- Slip two silicon Fig. 10-4) onto the join.
- Leave the silicon

①

②

10.2 ANODE CABLE SHEATH PEELING

- Peel the sheath of the end of cut anode cable and new anode cable are as follows.
- The anode cable structure is outlined in Fig. 10-2. Note that the sheath consists of two layers.
- The method used to peel the sheath back is illustrated in Fig. 10-3. Use a cutter knife, taking care not to damage the core leads.

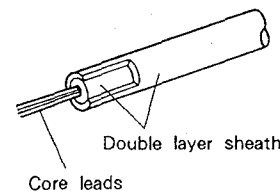


Fig. 10-2 Anode cable structure

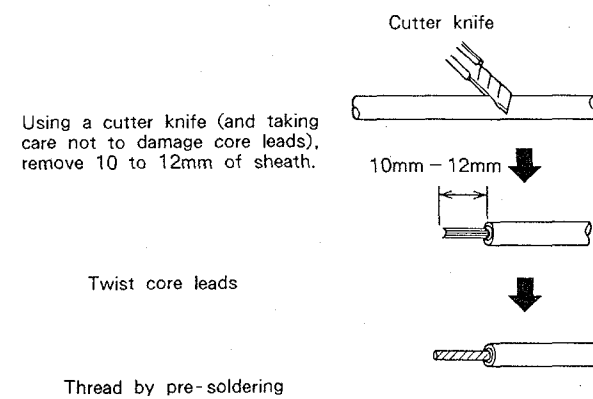


Fig. 10-3 Anode cable sheath peeling

10.3 ANODE CABLE JOINING PROCEDURE

- Join the cut anode cable and the new anode cable to restored as shown in Fig. 10-1. Also, when replacing the FBT, refer to section 9.16 "Anode cable connection and disconnection".
- Slip two silicon tubes (silicon tubes A and B in Fig. 10-4) onto the anode cables before making the join.
- Leave the silicon binder to harden overnight.
- The silicon binder is applied to guard the cable core leads from external air. Apply binder liberally. After completing the joint (at step ⑩ in Fig. 10-4-1 thru 3), make a hole in the silicon binder and check that the tube interior cannot be seen.

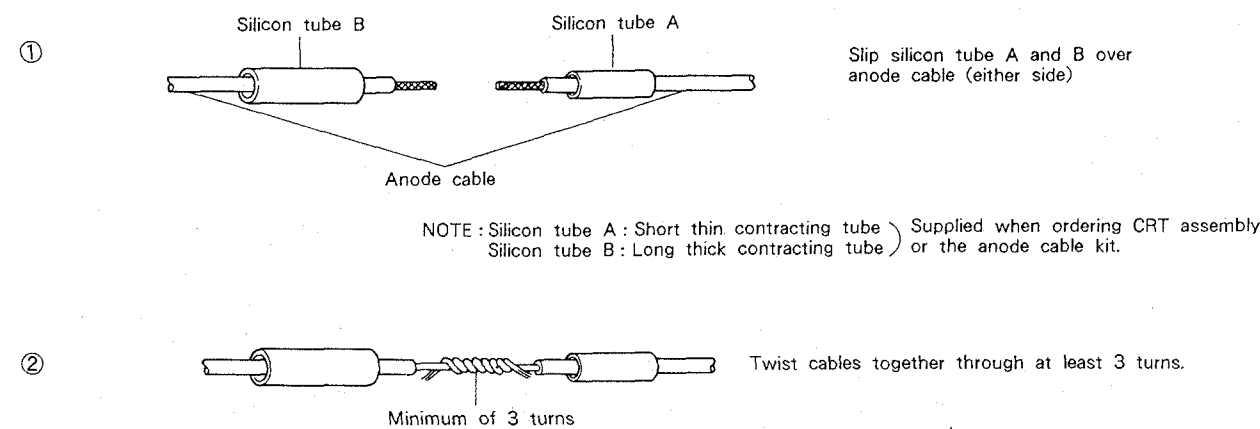


Fig. 10-4-1 Anode cable joining procedure (1)

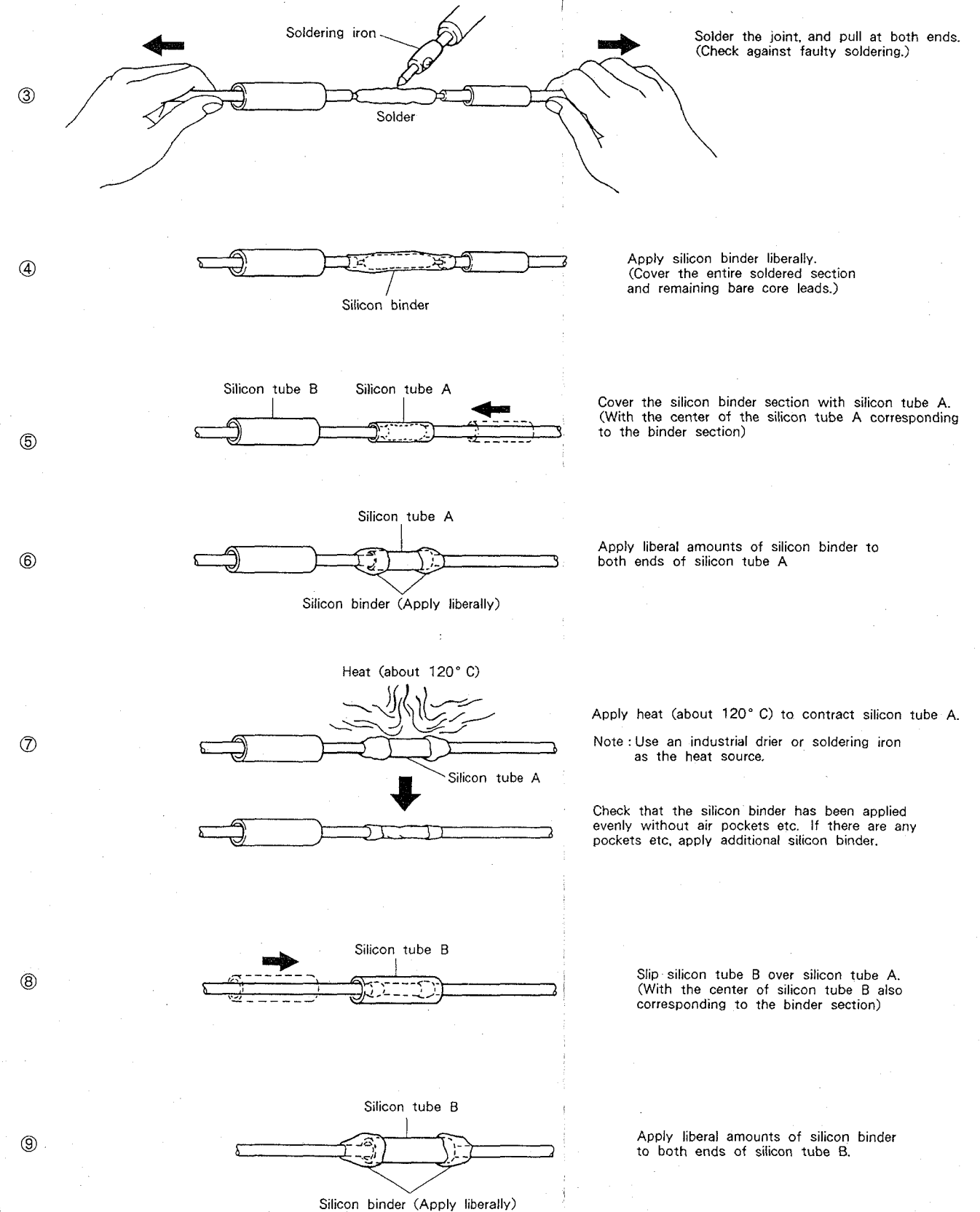


Fig. 10-4-2 Anode cable joining procedure (2)

■ PDG040

Microcomputer

● Pin Function

I/O I: CMOS input IS: COMS schmitt trigger input. O: CMOS output
N: N-ch open drain output A/D: A/D converter input

NO.	Pin name	I/O	Function	Active
1	REM	IS	Remote control signal input. Deciding by the level and edge.	LO
2	AIR0 (ST)	I	Broadcast format deciding input	LO
3	AIR1 (SAP)	I		LO
4	VMUTE	I/O	Video muting signal output and blanking detection input. Normally functions as an input port to detect no signal condition (HI) for auto power off. When generating the test cross signal, switching input or turning power ON/OFF, VMUTE (HI) is output.	HI
5	AMUTE	O	Audio muting signal output. When selecting MUTE mode, switching input and turning power ON/OFF, AMUTE (HI) is output.	HI
6	DNREQ	I	AFT down requiring signal input. When a desired station is placed lower than the received frequency, the tuner requires to lower the received frequency.	LO
7	UPREQ	I	AFT up requiring signal input. When a desired station is placed higher than the received frequency, the tuner requires to raise the received frequency.	LO
8	NC	—	Connected to HI.	HI
9	ACCLK	I	AC pulse detection input. Time control pulse for sleep timer, auto power off. Automatic deciding the frequency of 50Hz/60Hz. To detect the AC power off, dummy reset (software reset) is done when three waves are lacked.	HI
10	TV VMUTE	O	Video muting signal output for TV. When detuning, turning power ON/OFF or switching an antenna, TV VMUTE is output. When tuning, it is released when AFT is in 62.5kHz step.	HI
11	TV AMUTE	O	Audio muting signal output for TV. When detuning, turning power ON/OFF or switching an antenna, TV AMUTE is output. When tuning, it is released if AFT is completely tuned.	HI
12	MTS2 (MAIN)	O	MTS mode output.	LO
13	MTS1 (SAP)	O		LO
14	DA0	O	D/A converter switching output. This selects the output of analog multiplexer IC201 and IC202 (TC4051BP).	HI
15	DA1			
16	DA2			
17	DA3			

NO.	Pin name	I/O	Function	Active
18	OSDSTB	O	OSD IC204 (UPD6145C-001) data writing strobe pulse output. After data transmission, a positive pulse of minimum 1.9μsec is output.	HI
19	OSD	O	OSD IC204 (UPD6145C-001) chip enable output.	LO
20	EAROM	O	EAROM IC205 (M6M8011P) chip enable output.	LO
21	OPTION	O	Function switching diodes (D216 to D219) reading pulse output. Just after reset, LO pulse is output only once.	LO
22	KI0	I	Main unit key on reading input port (key scanning input) Normally HI.	LO
23	KI1			
24	KI2			
25	KI3			
26	KO0	N	Main unit key on reading pulse output (key scanning output) Normally LO. When a key is pressed, scanning starts, and ports which are not active are set to HI.	LO
27	KO1			
28	KO2			
29	KO3			
30	RELAY (OD)	N	Power relay (RY651) control. LO: Relay ON, HI: Relay OFF	LO
31	NC	I	Connected to GND. Used when developing a program.	LO
32	VSS	I	GND	LO
33	INP0	N	Input signal switching output.	
34	INP1			
35	INP2			
36	XTAL OUT	O	Connect a microcomputer clock oscillator. (A ceramic oscillator of 4.2MHz is connected.)	
37	EXTAL IN	I		
38	RESET	IS/O	System reset. When the power is turned on, LO is output, and the peripheral circuits are reset. In the other cases, this functions as an input port for RESET pulse.	LO
39	SCK	O	Serial transmission clock output. Used for interface with an OSD IC204 UPD6145C-001 and an EAROM IC205 (M6M80011P).	
40	SO	O	Serial data output. Used for interface with an OSD IC204 UPD6145C-001 and an EAROM IC205 (M6M80011P).	
41	BUSY	I	Writing BUSY input from a non-volatile memory EAROM IC205 (M6M80011P). Until HI is output from the EAROM IC205 (M6M80011P), the system is in standby mode for writing.	LO
42	SI	IS	Serial data input. Used for interface with an EAROM IC205 (M6M80011P).	
43	ANT	O	Antenna switching signal output.	
44	PWM	O	PWM output. Pulse train output of a D/A converter before analog voltage conversion.	
45	LOCK	IS	PLL lock detection input. When the PLL IC303 (TD6359P) is locked with the data sent from the microcomputer, LO is input.	LO
46	HS	IS	Horizontal sync count input for the tuner AFT. H-SYNC is counted with the cycle of 7.8msec, and when the counted amount is from 108 to 139, the system decides that a station exists.	

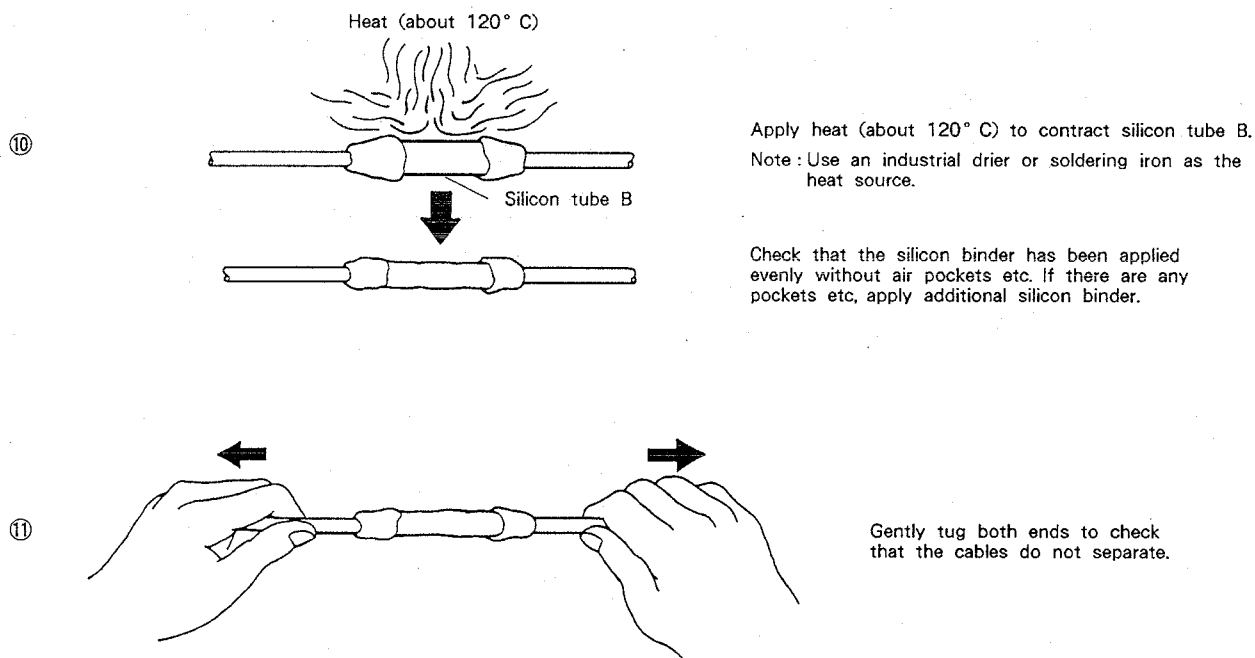


Fig. 10-4-3 Anode cable joining procedure (3)

11. HOW TO CLEAN

Note: Avoid fingerprints on the optical system parts such as the lens and mirror so be sure not to hold them with rear hand.

11.1 HOW TO CLEAN LENS AND MIRROR

When cleaning the lens and mirror, use the following specified cloth.

Cleaning cloth.....SAVINA MINIMAX (Manufactured by Kanebo Textile (Co LTD), etc.

1. Be sure to remove sand dust with an air brush, etc.
2. When it is stained slightly, breathe upon it and wipe away with the specified cleaning cloth.

For other stains than the above, wipe the stains away with the specified cloth into which a cleaning liquid has been soaked.

Cleaning liquid.....LENS LUSTER (Manufactured by Edmund Scientific Co.), etc.

11.2 HOW TO CLEAN SCREEN

When cleaning the screen, use a soft cloth so as not to damage the screen.

1. Wipe the stain away with a diluted neutral detergent soaked cloth.
2. Wipe the detergent away with a water soaked cloth.
3. Wipe the screen with a dry cloth to remove moisture on the screen.

Note: Absolutely do not use alcohol, benzine, thinner, etc. for cleaning in order not to wipe away the black print on the surface.

12. IC DESCRIPTION

■ AN5302K

Video, Chroma and Deflection signal processor

● Pin Function

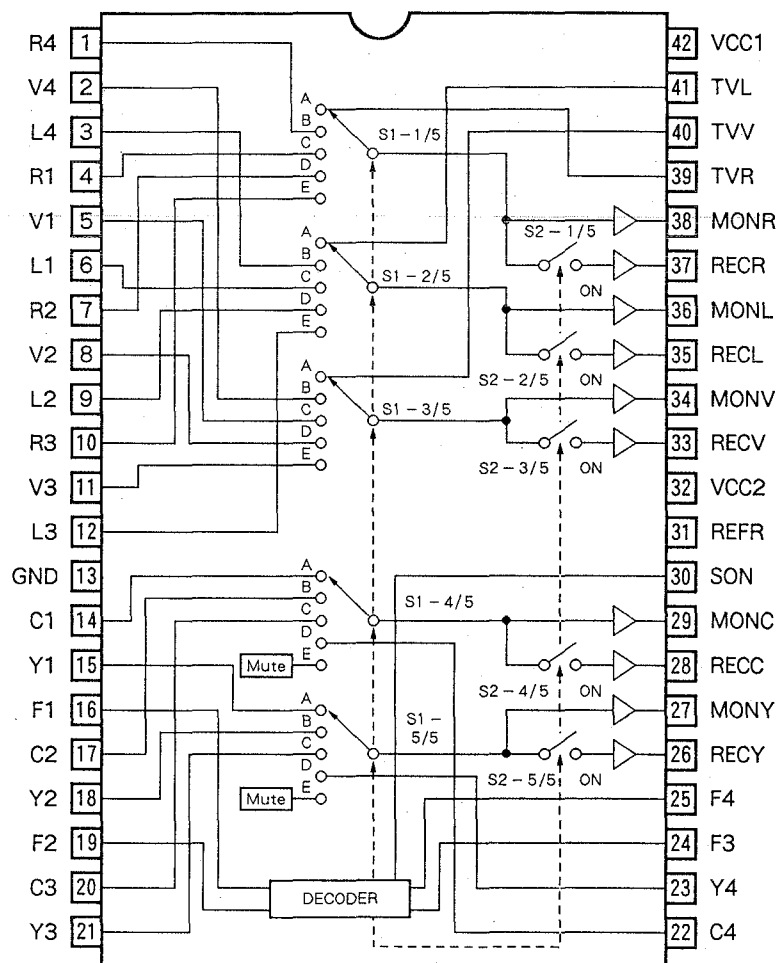
Pin	Function	Pin	Function
1	Ground for vertical section.	27	Ys input.
2	Detection filter of black level.	28	B input.
3	Composite video input 1.	29	G input.
4	Horizontal sync. separation input.	30	R input.
5	Vertical sync. separation input.	31	AIC filter and tint correction ON/OFF.
6	Vertical output.	32	Tint phase adjustment.
7	Capacitor of vertical sawtooth wave.	33	Ground for video and chroma sections.
8	Vertical feedback input.	34	3.58MHz oscillation.
9	Vertical pulse output.	35	Power supply voltage 1 (VCC 1).
10	Vertical integrate filter.	36	Power supply voltage 2 (VCC 2).
11	Vertical sync. separation input.	37	Tint control.
12	High voltage detection input (Hold down input).	38	White-peak limit adjustment.
13	H. AFC filter.	39	Start point adjustment of black level.
14	Reference voltage of hold down.	40	Color control.
15	FBP input for phase comparison.	41	ACC detection filter.
16	Synchronous detection filter.	42	Chroma signal input.
17	504kHz (32fH) oscillation.	43	Delay time adjustment.
18	Power supply voltage 3 for horizontal section.	44	Brightness control.
19	H. blanking pulse input.	45	Adjustment of DC regenerate quantity.
20	Ground for horizontal section.	46	Y signal input.
21	H. drive pulse output.	47	Capacitor for Y clamp.
22	High voltage detection input (shut down input).	48	Y/C separation output 1 (Y).
23	Y output.	49	Contrast control.
24	B - Y output.	50	Y/C separation output 2 (C).
25	G - Y output.	51	Picture quality control.
26	R - Y output.	52	Composite video input 2 (1H delay).

■ PA0040

AV function selector

CONTROL PIN No.	Pin 16 (F1)	Pin 19 (F2)	Pin 24 (F3)	Pin 25 (F4)
SWITCH POSITION				
SWITCH No.				
S1 (1/5 - 5/5)	A	H	H	L
	B	*	*	H
	C	H	L	L
	D	L	H	L
	E	L	L	L
S2 (1/5 - 5/5)	OFF	L	H	L
	ON	H	H	L
		*	*	H
		H	L	L
		L	L	L

Note : • LOGIC LEVEL "H" 5V, "L" 0V
 • * mark.....Don't care



● Pin Function

Pin	Pin name	Function	Pin	Pin name	Function
1	R4	Audio signal input 4 of R ch.	22	C4	Chrominance signal input 4.
2	V4	Video signal input 4.	23	Y4	Luminance signal input 4.
3	L4	Audio signal input 4 of L ch.	24	F3	Mode selection terminal 3.
4	R1	Audio signal input 1 of R ch.	25	F4	Mode selection terminal 4.
5	V1	Video signal input 1.	26	RECY	Luminance signal output for RECORD.
6	L1	Audio signal input 1 of L ch.	27	MONY	Luminance signal output for MONITOR.
7	R2	Audio signal input 2 of R ch.	28	RECC	Chrominance signal output for RECORD.
8	V2	Video signal input 2.	29	MONC	Chrominance signal output for MONITOR.
9	L2	Audio signal input 2 of L ch.	30	SON	Discrimination terminal of S input signal.
10	R3	Audio signal input 3 of R ch.	31	REFR	Connect the reference resistor.
11	V3	Video signal input 3.	32	VCC2	Power supply terminal.
12	L3	Audio signal input 3 of L ch.	33	RECV	Video signal output for RECORD.
13	GND	Ground.	34	MONV	Video signal output for MONITOR.
14	C1	Chrominance signal input 1.	35	RECL	Audio signal output of L ch for RECORD.
15	Y1	Luminance signal input 1.	36	MONL	Audio signal output of L ch for MONITOR.
16	F1	Mode selection terminal 1.	37	RECR	Audio signal output of R ch for RECORD.
17	C2	Chrominance signal input 2.	38	MONR	Audio signal output of R ch for MONITOR.
18	Y2	Luminance signal input 2.	39	TVR	Audio signal input of TV R ch.
19	F2	Mode selection terminal 2.	40	TVV	Video signal input of TV.
20	C3	Chrominance signal input 3.	41	TVL	Audio signal input of TV L ch.
21	Y3	Luminance signal input 3.	42	VCC1	Power supply terminal.

■ PA0036

Convergence Correction Signal Generator

● Pin Function

Pin	Pin name	Function	Pin	Pin name	Function
1	HBI	H. blanking pulse input.	22	HSK	V. sawtooth wave × 1/2H sawtooth wave output
2	VBI	V. blanking pulse input.	23	VSK	1/2V. sawtooth wave × H. sawtooth wave output
3	VSO0	V. sawtooth wave output.	24	KEY	V. sawtooth wave × H. sawtooth wave output.
4	VSBI	Buffer input of V. sawtooth wave.	25	HSI3	H. sawtooth wave input.
5	VOPI	V. OP amp. input.	26	HSO1	H. sawtooth wave output.
6	VPO	V. OP amp. output.	27	HSI2	H. sawtooth wave input.
7	VPI	V. parabolic wave input.	28	HSI1	H. sawtooth wave input.
8	V4	V. 4th wave output.	29	H3I	H. 3rd wave input.
9	MPXI1	MPX input.	30	H3O	H. 3rd wave output.
10	MPXI2		31	HPI	H. parabolic wave input.
11	MPXO	MPX output.	32	HPO	H. OP amp. output.
12	VSI1	V. sawtooth wave input.	33	HOP1	H. OP amp. input.
13	VSI2		34	HSO0	H. sawtooth wave output.
14	VSO	V. sawtooth wave output.	35	HBC	Capacitor for correct the H. sawtooth wave.
15	V3	V. 3rd wave output.	36	VCC	Power supply voltage.
16	SLIN1	1/2H 3rd wave output.	37	HSC	Capacitor for integrate the H. sawtooth wave.
17	SLIN2		38	GND	Ground.
18	VSH3	V. sawtooth wave × H. 3rd wave output	39	VSC	Capacitor for integrate the V. sawtooth wave.
19	VPHP	V. parabolic wave × H. parabolic wave output	40	VEE	Power supply voltage.
20	VPHS	V. parabolic wave × H. sawtooth wave output	41	VI	V. blanking pulse input.
21	VSHP	V. sawtooth wave × H. parabolic wave output	42	HI	H. blanking pulse input.

CMOS output input	Active
	LO
MONO	LO
H	
H	LO
Power ON/OFF.	HI
turning	HI
received	LO
received	LO
	HI
Automatic (software)	HI
tching an kHz step.	HI
switching ely tuned.	HI
MONO	LO
H	
H	LO
DA0	
H	
L	
H	
L	
H	
L	
H	
L	
H	
L	
H	

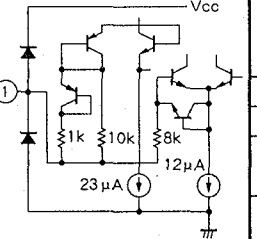
NO.	Pin name	I/O	Function	Active																								
18	OSDSTB	O	OSD IC204 (UPD6145C-001) data writing strobe pulse output. After data transmission, a positive pulse of minimum 1.9μsec is output.	HI																								
19	OSD	O	OSD IC204 (UPD6145C-001) chip enable output.	LO																								
20	EAROM	O	EAROM IC205 (M6M8011P) chip enable output.	LO																								
21	OPTION	O	Function switching diodes (D216 to D219) reading pulse output. Just after reset, LO pulse is output only once.	LO																								
22	KI0	I	Main unit key on reading input port (key scanning input) Normally HI.	LO																								
23	KI1																											
24	KI2																											
25	KI3																											
26	KO0	N	Main unit key on reading pulse output (key scanning output) Normally LO. When a key is pressed, scanning starts, and ports which are not active are set to HI.	LO																								
27	KO1																											
28	KO2																											
29	KO3																											
30	RELAY (OD)	N	Power relay (RY651) control. LO : Relay ON, HI : Relay OFF	LO																								
31	NC	I	Connected to GND. Used when developing a program.	LO																								
32	VSS	I	GND	LO																								
33	INP0	N	Input signal switching output.	<table><tr><th>FUNCTION</th><th>INP0</th><th>INP1</th><th>INP2</th></tr><tr><td>TV</td><td>H</td><td>H</td><td>L</td></tr><tr><td>VDP</td><td>H</td><td>L</td><td>L</td></tr><tr><td>VIDEO 1</td><td>L</td><td>H</td><td>L</td></tr><tr><td>VIDEO 2</td><td>L</td><td>L</td><td>L</td></tr><tr><td>VIDEO 3</td><td>H</td><td>H</td><td>H</td></tr></table>	FUNCTION	INP0	INP1	INP2	TV	H	H	L	VDP	H	L	L	VIDEO 1	L	H	L	VIDEO 2	L	L	L	VIDEO 3	H	H	H
FUNCTION	INP0				INP1	INP2																						
TV	H				H	L																						
VDP	H				L	L																						
VIDEO 1	L	H	L																									
VIDEO 2	L	L	L																									
VIDEO 3	H	H	H																									
34	INP1																											
35	INP2																											
36	XTAL OUT	O	Connect a microcomputer clock oscillator. (A ceramic oscillator of 4.2MHz is connected.)																									
37	EXTAL IN	I																										
38	RESET	IS/O	System reset. When the power is turned on, LO is output, and the peripheral circuits are reset. In the other cases, this functions as an input port for RESET pulse.	LO																								
39	SCK	O	Serial transmission clock output. Used for interface with an OSD IC204 UPD6145C-001 and an EAROM IC205 (M6M80011P).																									
40	SO	O	Serial data output. Used for interface with an OSD IC204 UPD6145C-001 and an EAROM IC205 (M6M80011P).																									
41	BUSY	I	Writing BUSY input from a non-volatile memory EAROM IC205 (M6M80011P). Until HI is output from the EAROM IC205 (M6M80011P), the system is in standby mode for writing.	LO																								
42	SI	IS	Serial data input. Used for interface with an EAROM IC205 (M6M80011P).																									
43	ANT	O	Antenna switching signal output.	<table><tr><td>ANTENNA - 1</td><td>L</td></tr><tr><td>ANTENNA - 2</td><td>H</td></tr></table>	ANTENNA - 1	L	ANTENNA - 2	H																				
ANTENNA - 1	L																											
ANTENNA - 2	H																											
44	PWM	O	PWM output. Pulse train output of a D/A converter before analog voltage conversion.																									
45	LOCK	IS	PLL lock detection input. When the PLL IC303 (TD6359P) is locked with the data sent from the microcomputer, LO is input.	LO																								
46	HS	IS	Horizontal sync count input for the tuner AFT. H-SYNC is counted with the cycle of 7.8msec, and when the counted amount is from 108 to 139, the system decides that a station exists.																									

NO.	Pin name	I/O	Function	Active																											
47	CROSS	O	Indicates the test cross signal generation. To prevent burning CRTs when it is set to test cross screen, the output level of the OSD IC204 (UPD6145C) is lowered by controlling the Q237 through Q239.	HI																											
48	PLL CLK	O	Clock output for transmitting PLL data. Clock output for transmitting serial data to the PLL IC303 (TD6359P).																												
49	PLL DT	O	PLL data output. Serial data is output to the PLL IC303 (TD6359P).																												
50	PLL EN	O	PLL data enable output. Chip enable output to transmit the serial data to the PLL IC303 (TD6359P).	HI																											
51	P	O	Pulse output for watch dog timer. While TBT interruption and PDM interruption in a program function normally, a pulse of 1msec is output with the cycle of 7.8msec.																												
52	PIP	O	P in P function ON. Not used.	HI																											
53	PINP0	O	Input for P in P. Switching signal output. Not used.	<table><tr><th>FUNCTION</th><th>PINP0</th><th>PINP1</th><th>PINP2</th></tr><tr><td>TV</td><td>H</td><td>H</td><td>L</td></tr><tr><td>VDP</td><td>H</td><td>L</td><td>L</td></tr><tr><td>VIDEO 1</td><td>L</td><td>H</td><td>L</td></tr><tr><td>VIDEO 2</td><td>L</td><td>L</td><td>L</td></tr><tr><td>VIDEO 3</td><td>H</td><td>H</td><td>H</td></tr></table>				FUNCTION	PINP0	PINP1	PINP2	TV	H	H	L	VDP	H	L	L	VIDEO 1	L	H	L	VIDEO 2	L	L	L	VIDEO 3	H	H	H
FUNCTION	PINP0			PINP1	PINP2																										
TV	H			H	L																										
VDP	H			L	L																										
VIDEO 1	L	H		L																											
VIDEO 2	L	L	L																												
VIDEO 3	H	H	H																												
54	PINP1																														
55	PINP2																														
56	NC	N																													
57	SIZE (DPS)	N	For the model with P in P function, size switching output. For the model with surround function, dynamic phase surround.	HI																											
58	POST (DOLBY)	N	For the model with P in P function, position switching pulse output. For the model with surround function, DOLBY SURROUND MODE.	HI																											
59	PMUTE	N	When P in P is set to ON and the input of P in P is TV, this is released (LO).	<table><tr><td></td><td colspan="2">PINP INPUT = TV</td><td>OTHER</td></tr><tr><td>PINP : ON</td><td colspan="2">LO</td><td>HI</td></tr><tr><td>PINP : OFF</td><td colspan="2">HI</td><td>HI</td></tr></table>					PINP INPUT = TV		OTHER	PINP : ON	LO		HI	PINP : OFF	HI		HI												
	PINP INPUT = TV		OTHER																												
PINP : ON	LO		HI																												
PINP : OFF	HI		HI																												
60	NC	I																													
61	NC	I																													
62	PLL TEST	I	AFT operation stops. Used for testing the tuner.	LO																											
63	DPO	A/D	Analog voltage input for DPO control.	—																											
64	VCC	—	+5V Power supply voltage input.	—																											

■ CXA1124AS

US MPX Decoder

● Pin Function

Pin	Pin name	I/O	Function	Pin	Pin name	I/O	Function
1	SAP TC	O	Terminal that sets the time constants for the SAP carrier detection and the noise detection circuits. 	19	S OUT	O	Terminal for sub-output. From this terminal, monaural signal or SAP (only when an external dbx-TVNR is connected) is output.
2	ST LED		Terminal for STEREO indicator drive. Open collector output.	20	NR BPF		Monitor terminal for the dbx-TV block filter.
3	SAP LED		Terminal for SAP indicator drive. Open collector output.	21	SAP IN		Terminal that inputs signal from SAP OUT (pin 6)
4	LED G	—	Ground for LED.	22	VE WGT	I	Weighted terminal for the variable de-emphasis control effective value detection circuit.
5	VC SAP	I	Terminal for SAP VCO oscillation frequency control. When DC power is applied to this terminal, the SAP VCO oscillation frequency varies. Normally a resistor or variable resistor is connected.	23	MAIN IN	I	Terminal that inputs signal (L + R) from MAIN OUT (pin 36)
6	SAP OUT	O	Terminal that outputs the SAP FM detection.	24	ST IN	I	Terminal that inputs signal (L - R) from SUB OUT (pin 35)
7	M1		Terminal for mode control switching. For the mode matrix, refer to Table 12-1.	25	VE TC		Terminal that sets the time delay constant for the variable de-emphasis control effective value detection circuit. By connection 3.3µF capacitor to this terminal, the standard time delay constant will be obtained.
8	M2			26	VCA WGT	O	Weighted terminal for the VCA control effective value detection circuit.
9	FMONO		Terminal for mode control switching. Inputs three values. Sets forced monaural mode, and controls ST LED. For the mode matrix, refer to Table 12-1.	27	VCA TC		Terminal that sets the time delay constant for the VCA control effective value detection circuit. By connecting 10µF capacitor to this terminal, the standard time delay constant will be obtained.
10	SMD	I	Terminal for mode control switching. Controls the SOUT terminal output. For the mode matrix, refer to Table 12-1.	28	VCA IN	I	Terminal that inputs VCA. Inputs the variable de-emphasis output signal from pin 29 through the coupling capacitor.
11	FSAP		Terminal for mode control switching. For the mode matrix, refer to Table 12-1 and 12-2.	29	VE OUT	O	Terminal that outputs the variable de-emphasis signal.
12	MUTE		Terminal for the MUTE control. When set to "H" level, all outputs are muted.	30	VE		Terminal for the variable de-emphasis integration.
13	I SAP		Terminal that sets the reference current for the SAP system filter. By adjusting the current to this terminal, the cut-off frequency changes.	31	GND		Ground terminal.
14	I LPF	O	Terminal that sets the reference current for the stereo system filter and dbx-TVNR system filter. By adjusting the current to this terminal, the cut-off frequency for each system changes.	32	VCC		+9V power supply terminal.
15	I VCO		Terminal that sets the reference current for the stereo VCO and SAP VCO. By adjusting the current to this terminal, the oscillation frequency for each changes.	33	VRS		Terminal for the reference voltage of the signal. The voltage is set to the half of the power supply voltage.
16	E SAP	I	Terminal that inputs the SAP signal from the external dbx-TV NR (optional)	34	I TIME	I	Terminal that inputs the timing current of the effective direct detection. The timing current determines the time delay constant for the detection circuit and the variable de-emphasis characteristics.
17	R OUT	O	Terminal for Rch output.	35	SUB OUT		Terminal that outputs L - R signal.
18	L OUT	O	Terminal for Lch output.	36	MA OUT	O	Terminal that outputs L + R signal.
				37	PL INT1		Terminal for the loop filter integration of the pilot cancel circuit.
				38	PL INT2	I	Terminal that inputs the sound multiplex signal.
				39	COMP IN	O	Terminal for the loop filter integration of the PLL in the stereo block.
				40	PC INT1	I	
				41	PC INT2	I	
				42	SAP BPF	O	Monitor terminal for SAP BPF.

- * H : 8.5V (Vcc - 0.5V) - 9V (Vcc)
- H : 2.0V - 9V (Vcc)
- M : 2.0V - 7V (Vcc - 2V)
- L : 0V (GND) - 0.8V
- By changing the FSAP (pin 11) setting, the SAP discriminant mode will change. (The LOUT and ROUT outputs will change.)
- * 1 : FSAP...GND (automatic SAP discriminant mode selection)
- * 2 : FSAP...Vcc (+9V) (fixed SAP discriminant mode)

Broadcast Mode	LED		Terminal			* 1 Output		* 2 Output	
	ST (Pin 2)	SAP (Pin 3)	M1 (Pin 7)	M2 (Pin 8)	FMONO (Pin 9)	LOUT (Pin 18)	ROUT (Pin 17)	LOUT (Pin 18)	ROUT (Pin 17)
MONO	OFF	OFF	L	L	—	L + R	L + R	L + R	MUTE
	OFF	OFF	L	H	—	L + R	L + R	MUTE	MUTE
	OFF	OFF	H	L	—	L + R	L + R	L + R	L + R
	OFF	OFF	H	H	—	MUTE	MUTE	MUTE	MUTE
MONO + SAP	OFF	ON	L	L	—	L + R	SAP	L + R	SAP
	OFF	ON	L	H	—	SAP	SAP	SAP	SAP
	OFF	ON	H	L	—	L + R	L + R	L + R	L + R
	OFF	ON	H	H	—	MUTE	MUTE	MUTE	MUTE
STEREO	ON	OFF	L	L	L	L	R	L + R	MUTE
	ON	OFF	L	L	M	L + R	L + R	L + R	MUTE
	OFF	OFF	L	L	* H	L + R	L + R	L + R	MUTE
	ON	OFF	L	H	L	L	R	MUTE	MUTE
	ON	OFF	L	H	M	L + R	L + R	MUTE	MUTE
	OFF	OFF	L	H	* H	L + R	L + R	MUTE	MUTE
	ON	OFF	H	L	L	L	R	L	R
	ON	OFF	H	L	M	L + R	L + R	L + R	L + R
	OFF	OFF	H	L	* H	L + R	L + R	L + R	L + R
	ON	OFF	H	H	L, M	MUTE	MUTE	MUTE	MUTE
	OFF	OFF	H	H	* H	MUTE	MUTE	MUTE	MUTE
	ON	ON	L	L	L	L + R	SAP	L + R	SAP
STEREO + SAP	ON	ON	L	L	M	L + R	SAP	L + R	SAP
	OFF	ON	L	L	* H	L + R	SAP	L + R	SAP
	ON	ON	L	H	L	SAP	SAP	SAP	SAP
	ON	ON	L	H	M	SAP	SAP	SAP	SAP
	OFF	ON	L	H	* H	SAP	SAP	SAP	SAP
	ON	ON	H	L	L	L	R	L	R
	ON	ON	H	L	M	L + R	L + R	L + R	L + R
	OFF	ON	H	L	* H	L + R	L + R	L + R	L + R
	ON	ON	H	H	L, M	MUTE	MUTE	MUTE	MUTE
	ON	ON	H	H	* H	MUTE	MUTE	MUTE	MUTE
	OFF	ON	H	H	* H	MUTE	MUTE	MUTE	MUTE
	ON	ON	H	H	* H	MUTE	MUTE	MUTE	MUTE

Table 12-1. Mode matrix

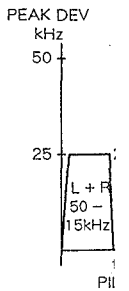
Broadcast Mode	SAP LED	Terminal		Output
		SMD (Pin 10)	FSAP (Pin 11)	SOUT (Pin 19)
• MONO	OFF	L	Vcc	L + R
		H	Vcc	* Ext
• STEREO	OFF	L	GND	L + R
		H	GND	L + R
• MONO + SAP	ON	L	Vcc	L + R
		H	Vcc	* SAP
• STEREO + SAP	ON	L	GND	L + R
		H	GND	* SAP

- * SAP : When an external dbx-TV (optional) is connected.
- * EXT : Signal input to pin 16 (ESAP).

Table 12-2. SMD function

● Operat

- ① L + R (M) The sou IN). The by STE L - R si and the emphasi
- ② L - R (S) The sar L - R si by the method signal (signal, a Finally, by SUB the L - the NR
- ③ SAP SAP, as carrier SAP BF frequen flat fre input to



2fH < 0°
fH < 90°
fH < 0°

(COMP IN)
(39)

SAP LED
DRIVE
MODE
CONTROL

- *H: 8.5V (Vcc - 0.5V) - 9V (Vcc)
- H: 2.0V - 9V (Vcc)
- M: 2.0V - 7V (Vcc - 2V)
- L: 0V (GND) - 0.8V
- By changing the FSAP (pin 11) setting, the SAP discriminant mode will change.
(The LOUT and ROUT outputs will change.)
- *1: FSAP...GND (automatic SAP discriminant mode selection)
- *2: FSAP...Vcc (+9V) (fixed SAP discriminant mode)

Broadcast Mode	LED		Terminal			* 1 Output		* 2 Output	
	ST (Pin 2)	SAP (Pin 3)	M1 (Pin 7)	M2 (Pin 8)	FMONO (Pin 9)	LOUT (Pin 18)	ROUT (Pin 17)	LOUT (Pin 18)	ROUT (Pin 17)
MONO	OFF	OFF	L	L	—	L+R	L+R	L+R	MUTE
	OFF	OFF	L	H	—	L+R	L+R	MUTE	MUTE
	OFF	OFF	H	L	—	L+R	L+R	L+R	L+R
	OFF	OFF	H	H	—	MUTE	MUTE	MUTE	MUTE
MONO + SAP	OFF	ON	L	L	—	L+R	SAP	L+R	SAP
	OFF	ON	L	H	—	SAP	SAP	SAP	SAP
	OFF	ON	H	L	—	L+R	L+R	L+R	L+R
	OFF	ON	H	H	—	MUTE	MUTE	MUTE	MUTE
STEREO	ON	OFF	L	L	L	L	R	L+R	MUTE
	ON	OFF	L	L	M	L+R	L+R	L+R	MUTE
	OFF	OFF	L	L	*H	L+R	L+R	L+R	MUTE
	ON	OFF	L	H	L	L	R	MUTE	MUTE
	ON	OFF	L	H	M	L+R	L+R	MUTE	MUTE
	OFF	OFF	L	H	*H	L+R	L+R	MUTE	MUTE
	ON	OFF	H	L	L	L	R	L	R
	ON	OFF	H	L	M	L+R	L+R	L+R	L+R
	OFF	OFF	H	L	*H	L+R	L+R	L+R	L+R
	ON	OFF	H	H	L, M	MUTE	MUTE	MUTE	MUTE
	OFF	OFF	H	H	*H	MUTE	MUTE	MUTE	MUTE
	ON	ON	L	L	L	L+R	SAP	L+R	SAP
STEREO + SAP	ON	ON	L	L	M	L+R	SAP	L+R	SAP
	OFF	ON	L	L	*H	L+R	SAP	L+R	SAP
	ON	ON	L	H	L	SAP	SAP	SAP	SAP
	ON	ON	L	H	M	SAP	SAP	SAP	SAP
	OFF	ON	L	H	*H	SAP	SAP	SAP	SAP
	ON	ON	H	L	L	L	R	L	R
	ON	ON	H	L	M	L+R	L+R	L+R	L+R
	OFF	ON	H	L	*H	L+R	L+R	L+R	L+R
	ON	ON	H	H	L, M	MUTE	MUTE	MUTE	MUTE
	OFF	ON	H	H	*H	MUTE	MUTE	MUTE	MUTE
	ON	ON	H	H	*H	MUTE	MUTE	MUTE	MUTE
	OFF	ON	H	H	*H	MUTE	MUTE	MUTE	MUTE

Table 12-1. Mode matrix

Broadcast Mode	SAP LED	Terminal		Output
		SMD (Pin 10)	FSAP (Pin 11)	SOUT (Pin 19)
• MONO	OFF	L	Vcc	L+R
• STEREO		H	Vcc	* Ext
		L	GND	L+R
		H	GND	L+R
• MONO + SAP	ON	L	Vcc	L+R
• STEREO + SAP		H	Vcc	* SAP
		L	GND	L+R
		H	GND	* SAP

- *SAP: When an external dbx-TV (optional) is connected.
- *EXT: Signal input to pin 16 (ESAP).

Table 12-2. SMD function

● Operation description

① L + R (MAIN)

The sound multiplex signal is input from pin 39 (COMP IN). The SAP signal and telemetry signal are suppressed by STEREO LPF. Then the pilot is canceled. Finally, the L-R signal and SAP signal are removed by MAIN LPF, and the flat frequency response is obtained by the de-emphasis circuit and input to matrix.

② L - R (SUB)

The same as the L + R signal until pilot canceling. The L - R signal has no carrier signal, since it is modulated by the double-sideband amplitude modulation (DSB-AM) method using the suppressed carrier. Therefore, the carrier signal (pseudo sine curve) is re-generated by the pilot signal, and the L - R signal is demodulated by this signal. Finally, the high frequency residual portion is eliminated by SUB LPF, the flat frequency response is obtained, and the L - R signal is input to the dbx-TV block through the NRSW circuit.

③ SAP

SAP, as shown in Fig. 12-1, is an FM signal having carrier of 5fH. First only the SAP signal is picked up by SAP BPF, then it is detected in FM. Finally, the high frequency residual portion is eliminated by SAP LPF, the flat frequency response is obtained, and the signal is input to the dbx-TV block through the NRSW circuit.

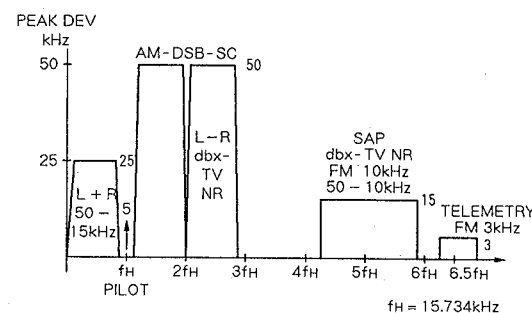


Fig. 12-1 Base band spectrum

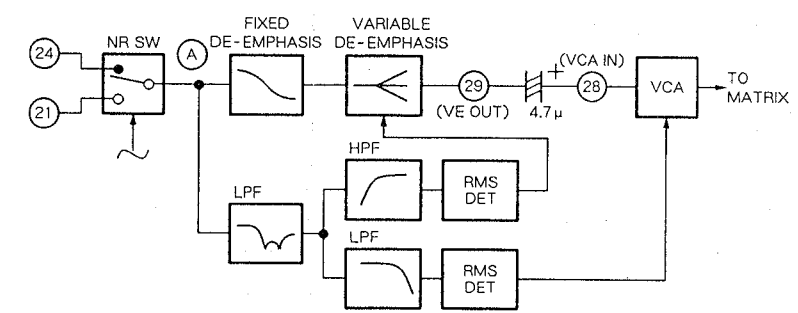


Fig. 12-2 dbx-TV Block

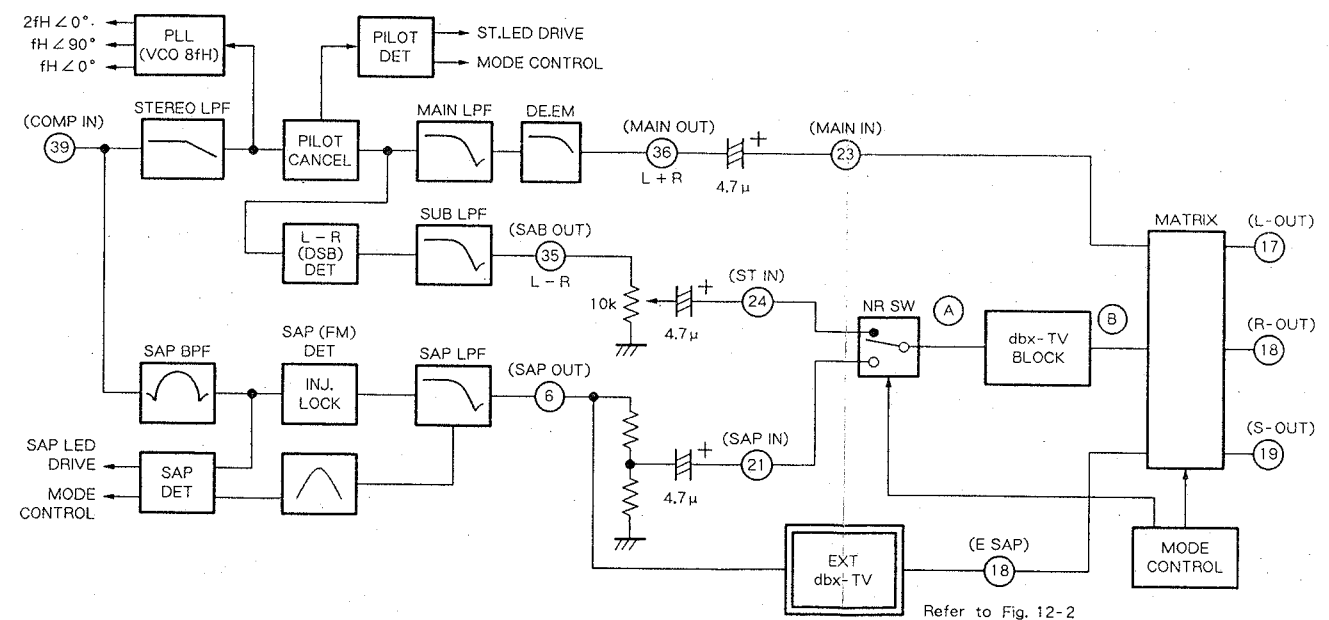


Fig. 12-3 Block diagram

■ UPD6145C — 001

On screen display (OSD)

● Pin Function

Pin	Pin name	I/O	Function	Active	Pin	Pin name	I/O	Function	Active
1	$\overline{\text{CS}}$	I	Normal operation is performed with this terminal set to "L" level. With this terminal set to "H" level, the shift clock is input to CLK, and the strobe signal input to STB is inhibited.	L	10	VMON	O	This terminal is set to "H" level when one of the VR, VG or VB character data output signal is set to "H" level.	H
2	CLK		Terminal that inputs the clock for data read-in. Data is read in from the DATA terminal at the leading edge of the clock.		11	VR		Terminal used to output the character data corresponding to R, G and B. Data is output with "active high."	H
3	STB		The terminal for strobe input after serial data input. 8-bit data is read at the leading edge of the pulse applied to the STB terminal. If the 8-bit data is a character data, the data address will be increased by 1 at the trailing edge of the pulse.		12	VG			H
4	DATA		Terminal that inputs control data. Data is read in with the timing of the clock connected to the CLK terminal.	H/L	13	VB		Terminal that output the blanking signal for out the video signal. Data is output with "active high".	H
5	VDD		+5V input terminal.	—	14	VBLK			H
6	$\overline{\text{CKOUT}}$	O	Inverted output of OSC OUT. To be used for the oscillation frequency check.	—	15	TESTIN	I	Terminal for test clock input. (Normally, to be connected to VSS.)	H
7	OSCOUT	I	To be connected to the oscillation capacitor and coil.	—	16	$\overline{\text{VSYNC}}$		Terminal for the vertical sync signal input. To be input with "active low".	L
8	OSCIN			—	17	$\overline{\text{HSYNC}}$		Terminal for the horizontal sync signal input. The oscillation occurs when HSYNC is set to "H" level, and is synchronized with the leading edge of $\overline{\text{HSYNC}}$. To be input with "active low."	L
9	VSS		To be connected to the system GND.	—	18	HOLD		The oscillation stops when this terminal is set to "L" level. At this time, VR, VG, VB and VBLK are set to "L" level. (Normally this terminal should be set to "H" level.)	L

■ M6M80011AP

64 × 16 bit EEPROM

● Pin Function

Pin	Pin name	I/O	Function	Active	Pin	Pin name	I/O	Function	Active
1	$\overline{\text{CS}}$	I	- Selects the chip at the "L" level. At the "H" level, the built-in sequential controller is reset. Before each mode operation, this terminal is set to "H" once. - During the write operation (when the BUSY output is set to "L"), the write operation is continued regardless of the input to this terminal. - When the write operation is completed, the mode read-in is enabled after this terminal is set to "H". However, the "status output" can be read-in when the write operation is started and the sequential controller is reset, with this terminal staying at "L".	L	4	DO	O	• Data is output from this terminal. DI and DO can be connected.	H/L
2	$\overline{\text{SCK}}$		- The input data is read at the leading edge of the clock. - The data is output at the trailing edge of the clock.	H/L	5	VSS	—	Ground for system.	—
3	DI		• Data is input through this terminal.	H/L	6	RESET	I	• When this terminal is set to "H", the sequential controller and the write circuit are reset, and the memory protect state is obtained. During the write operation, the operation is suspended if this terminal is set to "H".	H
					7	RDY/ BUSY	O	- This terminal is set to "L" during the write operation. - Also set to "L" when the power is turned on or off. At this time, no input will be allowed to be read in.	L
					8	VDD	—	+5V power supply terminal	—

13. CIRCUIT DESCRIPTION

13.1 STABILIZATION CIRCUIT OF AN ANODE VOLTAGE

A conventional stabilization circuit of an anode voltage is shown in Fig. 13-1.

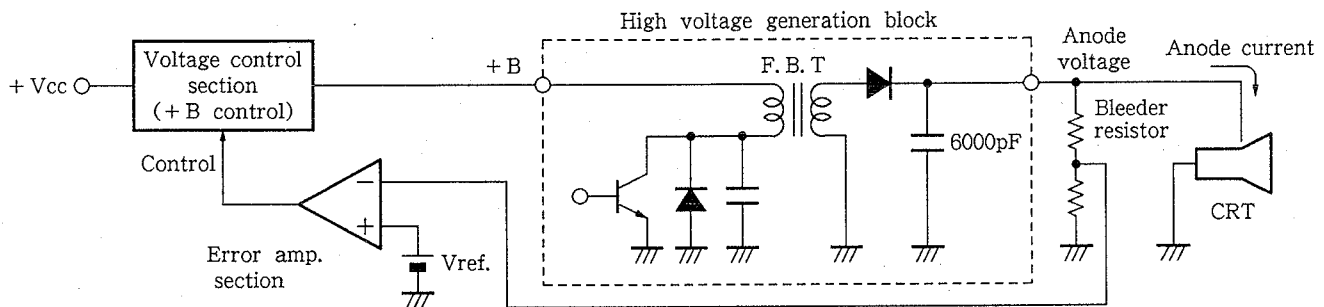


Fig. 13-1

In the conventional system, the anode voltage is directly divided by a bleeder resistor, and is fed back. By detecting the change of the feedback voltage, a voltage control section is controlled, and the anode voltage is stabilized. The SD-P4003 controls the anode voltage by detecting the change of the anode current. Fig. 13-2 shows the stabilization circuit.

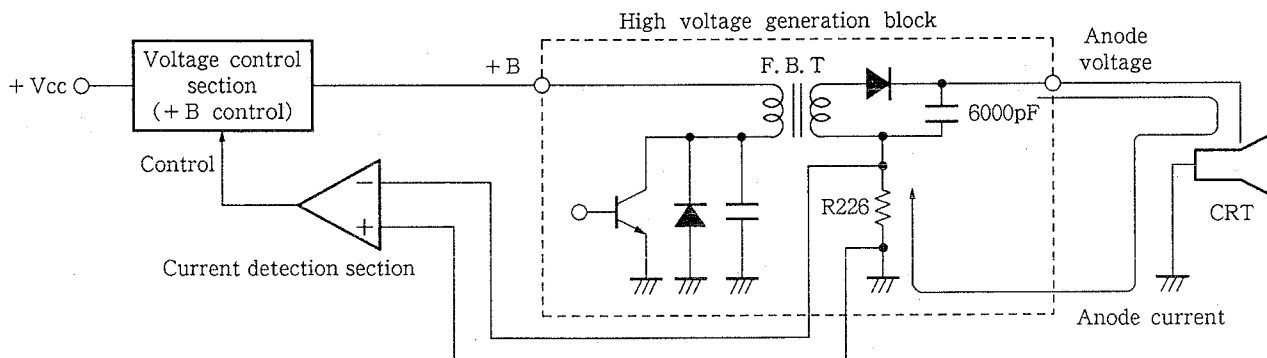


Fig. 13-2

This circuit detects the change of the anode current which causes the change of the anode voltage. Because the change of the anode voltage and that of the anode current are in inverse proportion to each other, the anode voltage can be controlled by detecting the change of this anode current. The anode current which returns to the flyback transformer (FBT) through the R226 resistor is detected by the current detection section. The voltage control section is controlled according to the change of the detected anode current which stabilizes the anode voltage.

13.2 CONTROLLING A PICTURE, SOUND QUALITY AND VOLUME BY THE IC203 (PDG040)

1. Operation

A block diagram of the D/A converter which controls a picture, sound quality and volume is shown in Fig. 13-3.

The IC203 (PDG040) microcomputer outputs the control data for 15 circuits by time sharing from the built-in 8-bit PWM output (44-pin). This control data is input to a PWM/DC conversion circuit, and converted to the DC voltage from the PWM pulse row. The converted DC voltage is a result of the time division multiplex of 15 kinds of data so that the desired data is selected by an analog multiplexer (IC201, IC202), and output to each buffer.

The IC203 (PDG040) cannot control switching timing of the PWM output by software so that it is converted to the stable DC voltage by the PWM/DC conversion circuit, and connected to the output side. 14 circuits are actually controlled so that one of the control data for 15 circuits is not used for controlling, but is used for selecting the X3 of the IC201.

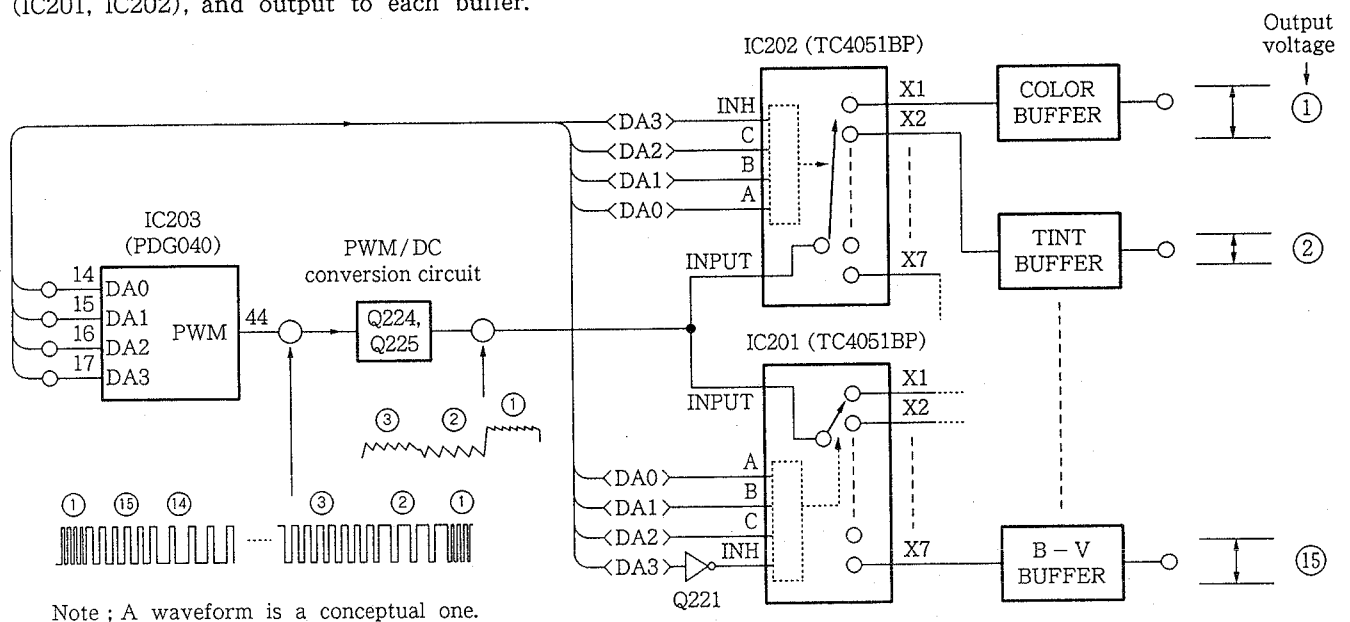


Fig. 13-3 Block diagram of D/A converter section for picture, sound quality and volume control

2. PWM output

The PWM output of the PDG040 is as shown in Fig. 13-4.

One conversion cycle of the PWM is $122\mu\text{sec}$, and the duty will be changed in 256 steps according to the content of the output data. When the data is output for 64 cycles (7.8msec), the content of the output data is rewritten. This means that the same data is output for 64 cycles.

This controls 14 circuits actually, however the data for 15 circuits is output for reasons of the program. (The data for one circuit has no meaning as a result.)

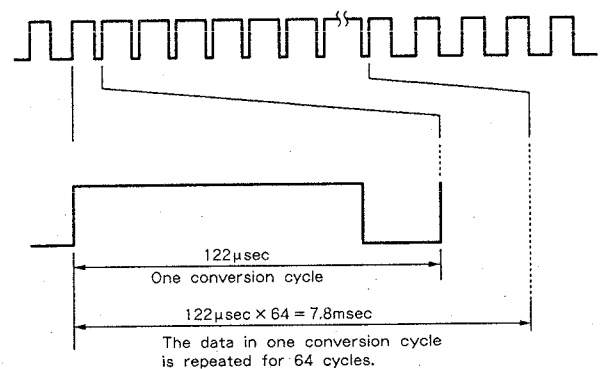


Fig. 13-4

3. PWM/DC conversion circuit

The output pulse train of the PWM is converted to DC in this circuit. The content of the data is changed for every 7.8msec. So the time constant is set wide enough not to output the pulse component of the PWM and also small enough to make the signal stable in 7.8msec period.

The data in the last 1msec of 7.8msec period is actually used as data. The DC voltage in this period is output to the circuit which controls by an analog multiplexer.

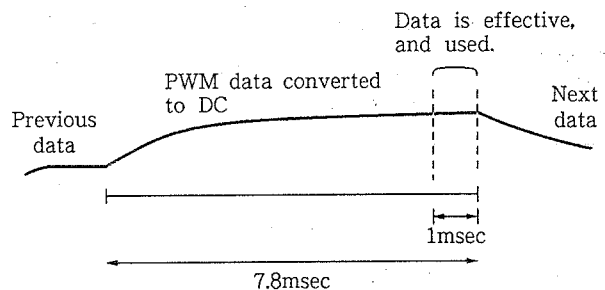


Fig. 13-5

4. Analog multiplexer

The two devices of CMOS ICs, IC201 and IC202 (TC4051BP), distribute the data converted to DC by the PWM/DC conversion circuit to each circuit. Until the output of the PWM/DC conversion circuit becomes stable, the output being converted is not connected for 6.8msec in 7.8msec period by selecting the X_0 of the IC202. The X_0 terminal is high impedance so that no load is added to the conversion circuit. The port designated by the PDG040 is selected only for the last 1msec in 7.8msec period, and the data is output to the buffer.

(Open)	X_0 (Pin 13) of IC202
COLOR	X_1 (Pin 14) of IC202
TINT	X_2 (Pin 15) of IC202
CONTRAST	X_3 (Pin 12) of IC202
BRIGHTNESS	X_4 (Pin 1) of IC202
SHARPNESS	X_5 (Pin 5) of IC202
BASS	X_6 (Pin 2) of IC202
TREBLE	X_7 (Pin 4) of IC202
VOLUME	X_0 (Pin 13) of IC201
BALANCE	X_1 (Pin 14) of IC201
Do not use	X_2 (Pin 15) of IC201
Do not use	X_3 (Pin 12) of IC201
CONVERGENCE R - H	X_4 (Pin 1) of IC201
CONVERGENCE R - V	X_5 (Pin 5) of IC201
CONVERGENCE B - H	X_6 (Pin 2) of IC201
CONVERGENCE B - V	X_7 (Pin 4) of IC201

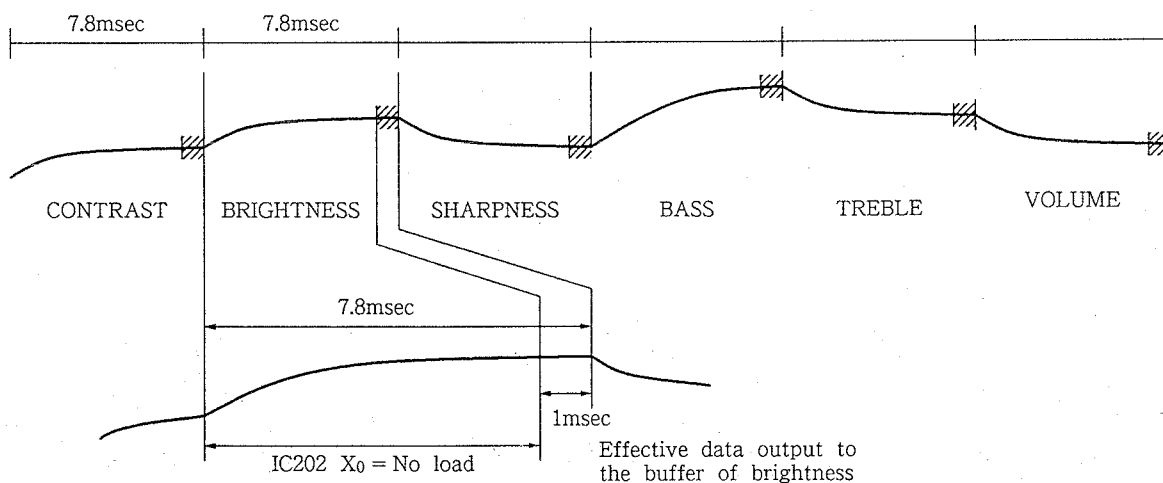


Fig. 13-6

13.3 POWER BLOCK

The SD-P4003/S/G type uses a switching regulator power supply circuit of the RCC (Ringing Choke Converter) system which has high resistance to a short circuit by load.

1. Basic circuit and operation description

A basic circuit is shown in Fig. 13-7. The circuit operates as follows.

- ① The input AC power is rectified and input to the switching circuit as V_{IN} .
- ② In the switching circuit, starting current I_1 flows to the base of the Q651 through the R258 resistor for starting and C715 capacitor. When the starting current I_1 flows, the Q651 is activated, and I_c starts flowing.
- ③ The I_c linearly increases as shown in Fig. 13-8. On the second side, a starting power is generated at the winding S to make the current I_s' flow, but it is blocked by D_s , and the I_s' does not flow.
- ④ At the same time the starting power is also generated at the base drive winding B, and the drive current I_D flows. Then the Q651 is instantaneously set to ON.
- ⑤ The I_c continues increasing to the point, $I_c = h_{FE} \times I_D$, where is the limit of the base drive current I_D .
- ⑥ When the increasing curve of the I_c is suppressed, counter electromotive force is generated on the base drive winding B. The V_{BE} of the Q651 is drastically biased invertedly by this counter electromotive force and the Q651 is instantaneously set to OFF.
- ⑦ At the same time, starting power is generated in the direction reversed in step ③ on the winding S of the second side. The I_s flows by this counter electromotive force. While the I_s is flowing, starting power is generated in the direction which is biased reversely between base and emitter of the Q651 on the base drive winding B.
- ⑧ When the starting power of the winding S is lost and the I_s does not flow, the starting power of the base drive winding B is also lost. Then the current I_1 flows, and the operation of step ② and after will be repeated, and the switching operation will continue. (Once started, the voltage is induced on the base drive coil by the interaction of coils of the transformer and the Q651 is set to ON again. Therefore switching will continue even if the R258, C715, D659, C721 and R266 are removed.)

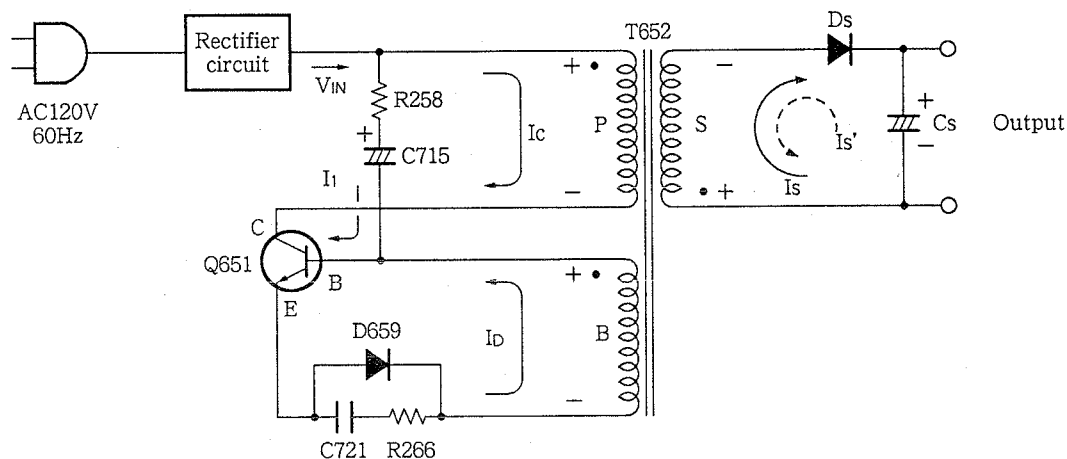


Fig. 13-7 Base circuit of the RCC system

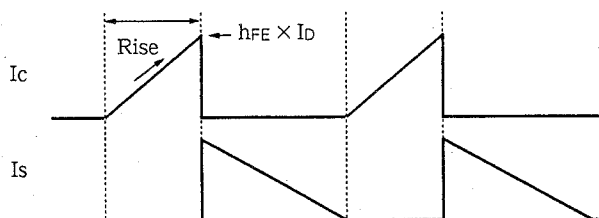


Fig. 13-8 Relations between I_c and I_s

2. Operation description of circuits

● Error detection circuit

When the change occurs on 135V on the output side, the change is amplified by the Q662, and input to a photocoupler (IC651) as I_a . In this photocoupler, a charging section and a non-charging section are coupled unelectricaly so that GND of both sections are not connected. The error output sent by the IC651 photocoupler is transmitted to the Q652 and Q653 pulse width control circuit. In this circuit, the pulse width of the I_c shown in Fig. 13-8 is changed so that the change of 135V is reduced.

● Overcurrent protection

When the heater power source, 13.5V, +23V and 35V lines are short-circuited by load, fuses, FU652, FU655, FU656 and FU658, are activated.

When 135V line is short-circuited by load, T652 transformer is in magnetic saturation which results in the loss of starting voltage at the base drive coil B of the T652. So the drive current I_D does not flow. On the other hand, the C715 is connected to the R259 starting resistor in series so that charging current for the C715 flows through the R258 only in starting. After starting, the current is not supplied through the R258. This means that the base current is cut, and the Q651 is interrupted and protected.

Once the circuit is cut off, the cutoff condition is kept even if the overload condition is removed. To start again, turn the POWER switch OFF, and ON again.

If the load on +135V line is not so large as to short-circuit but to overload, switching frequency will become extremely low, which results in an abnormal sound. In such case, check the load on the +135V line.

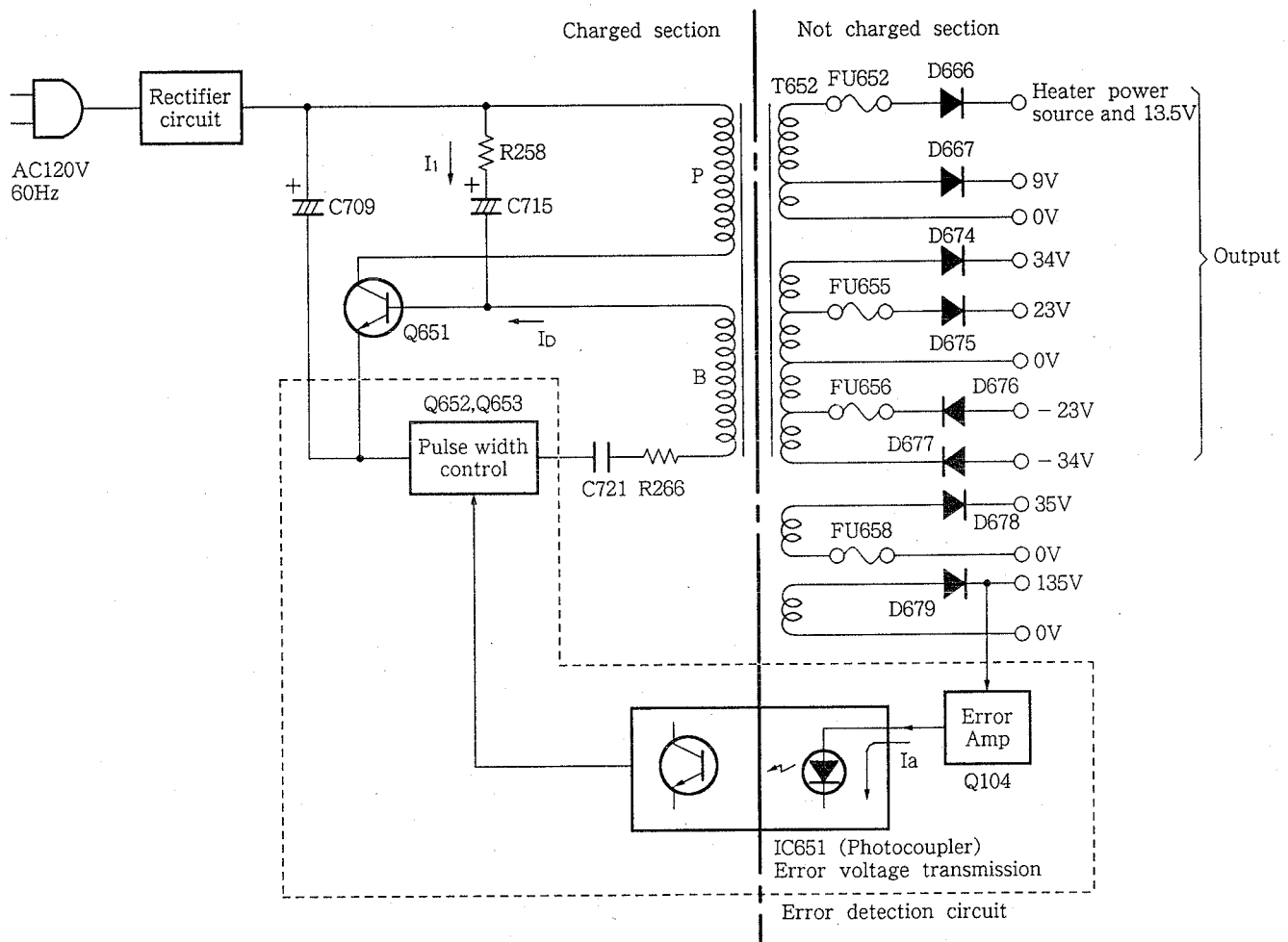


Fig. 13-9 Description of circuits

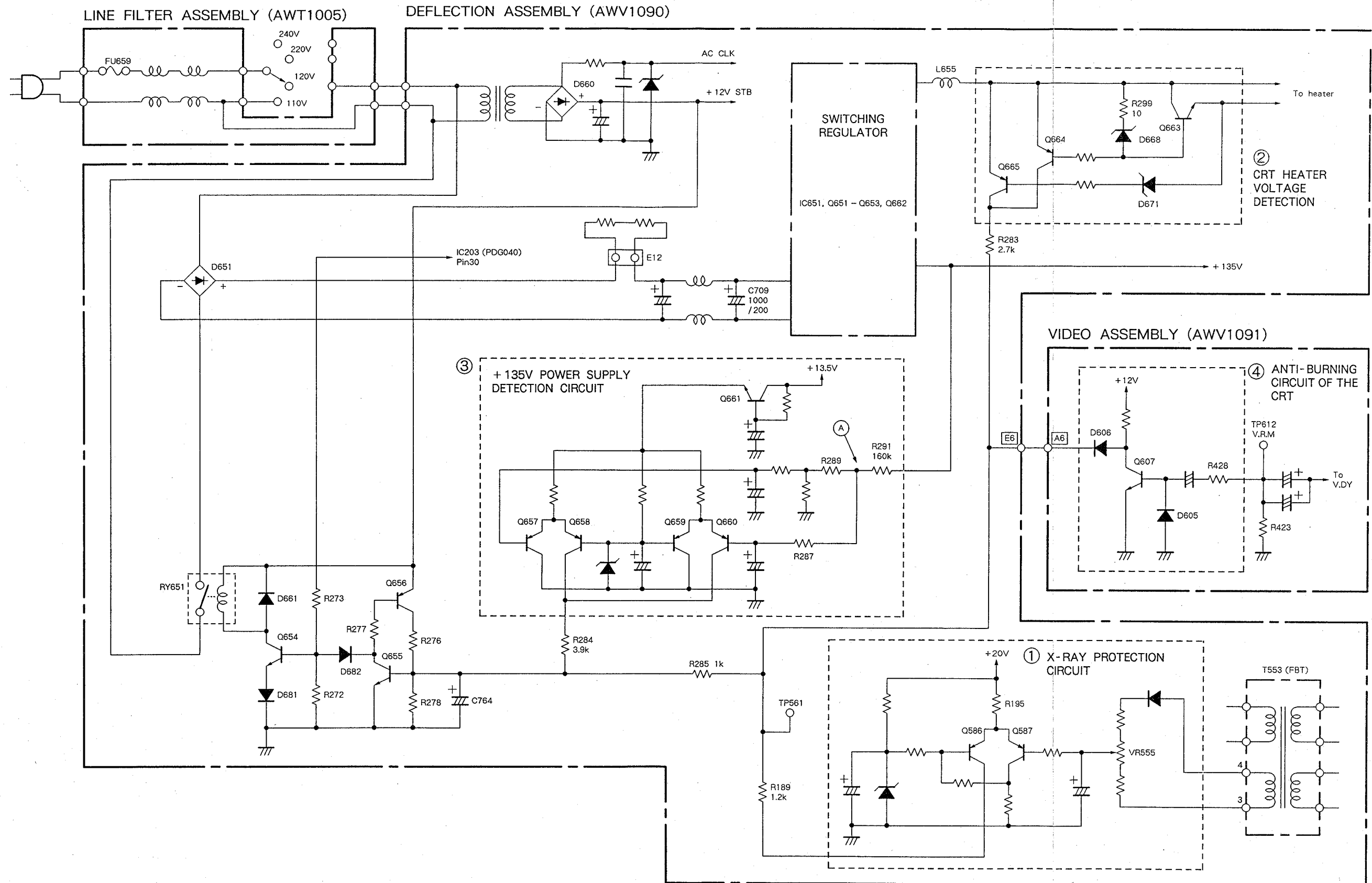


Fig. 14-1 BLOCK DIAGRAM OF PROTECTION CIRCUIT

14. TROUBLE SHOOTING

The projection monitor receiver for the SD-P4003/S/G type is equipped with various types of protection circuits. When a protection circuit is activated, the relay (RY651), which is used as the power switch, is turned off, so that the power to the set is turned off. If the power is automatically turned off immediately after the power is turned on, a protection circuit may be active.

Once a protection circuit is activated, Q656 functions so that the set cannot be turned on by the power switch on the front panel or on the remote control unit. To check the symptom, be sure to disconnect the AC plug from the AC outlet and wait for about 15 to 20 seconds, then reconnect the plug to the outlet. If the relay (RY651) is not turned on, the AC clock may not be input to pin 9 of IC203 (PDG040).

• Function of the protection circuits

1. X-ray protection circuit

When the anode voltage (normally, max. 31.8kV) is increased abnormally for some reasons, an X-ray may be emitted from the CRT. If the anode voltage is increased abnormally, the circuit detects it and turns off the relay (RY651).

The detection is effectuated by monitoring the output voltage of the coil mounted to pin 3 and pin 4 of F. B. T. (T553) that generates the anode voltage. If the anode voltage is increased, the output voltage of the coil also is increased. The differential amplifier of Q586 and Q587 detects the change in voltage. When the base voltage of Q665 reaches approx. 0.6 to 0.7 V, Q665 is turned on, and turns off Q654 which drives the power switch relay (RY651). The VR555 of the DEFLECTION assembly is adjusted at factory so that the X-ray protection circuit will be activated at the correct level. Repair should be effectuated by replacing the DEFLECTION assembly, and not by replacing the parts marked by × in the schematic diagram.

2. CRT heater voltage detection circuit

The CRT heater voltage is controlled by Q663 and D668, so that it is normally 6.3V. If the heater voltage is increased by some reasons, the life of the CRT will become shorter. If the heater is defective and the current to the heater is excessive, the heater voltage will be dropped. The CRT heater voltage detection circuit also detects this voltage drop to avoid the excessive current.

When the heater voltage is increased, Q665 and D671 will detect it. When the voltage drop occurs due to the excessive current, the voltage at the both ends of R299 (10Ω) will be increased. Q664 monitors this voltage. The output from the CRT heater voltage detection circuit is lead via R283 (2.7kΩ) to the same line as the output from the X-ray protection circuit.

3. +135V power supply detection circuit

This circuit detects an excessive current to the 135V power line, and an excessive voltage of over 145V to protect the load circuits. If an excessive current is applied to the 135V power line, the voltage drops. When the voltage drops under about 120V, Q660 is turned on, and it turns on Q655 through R284 (3.9kΩ). When Q655 is turned on, Q654 is turned off, then the relay (RY651) is turned off. Q656 functions so that the relay (RY651) cannot be turned on again except when the AC plug is disconnected from the AC outlet and reconnected after about 15 to 20 seconds.

4. Anti-burning circuit of the CRT

If the vertical deflection circuit does not function by some reasons, the CRT will be burnt out with a horizontal line. To prevent this, the output of TP612 (V.R.M.) is monitored by Q607. When no output is detected from TP612 (V.R.M.), Q607 is turned off, and the collector voltage is increased. This collector voltage will be output via D606 to the same line as the output from the X-ray protection circuit.

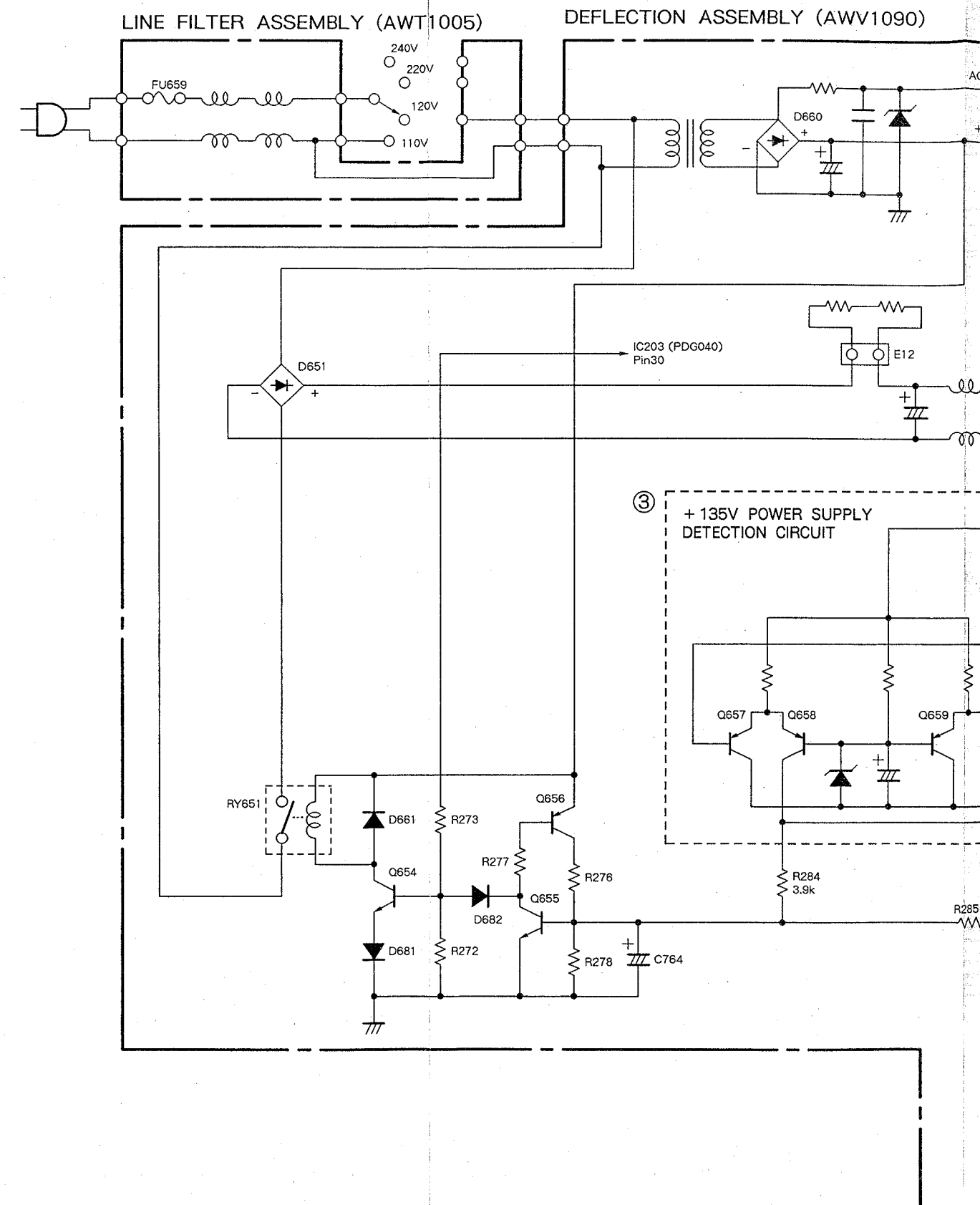
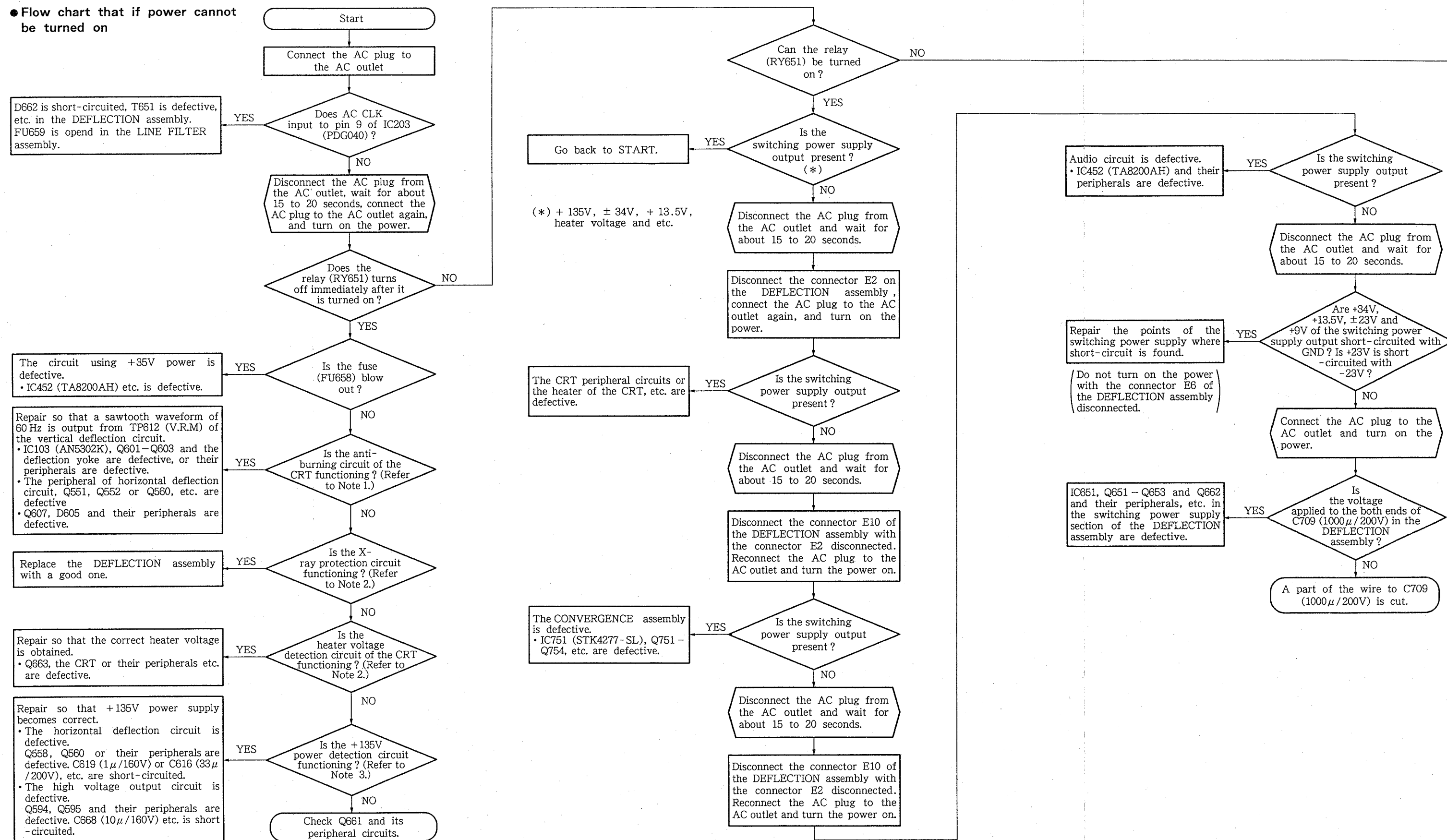


Fig. 14-1 BLOCK DIAGRAM OF PROTECTION C

● Flow chart that if power cannot be turned on



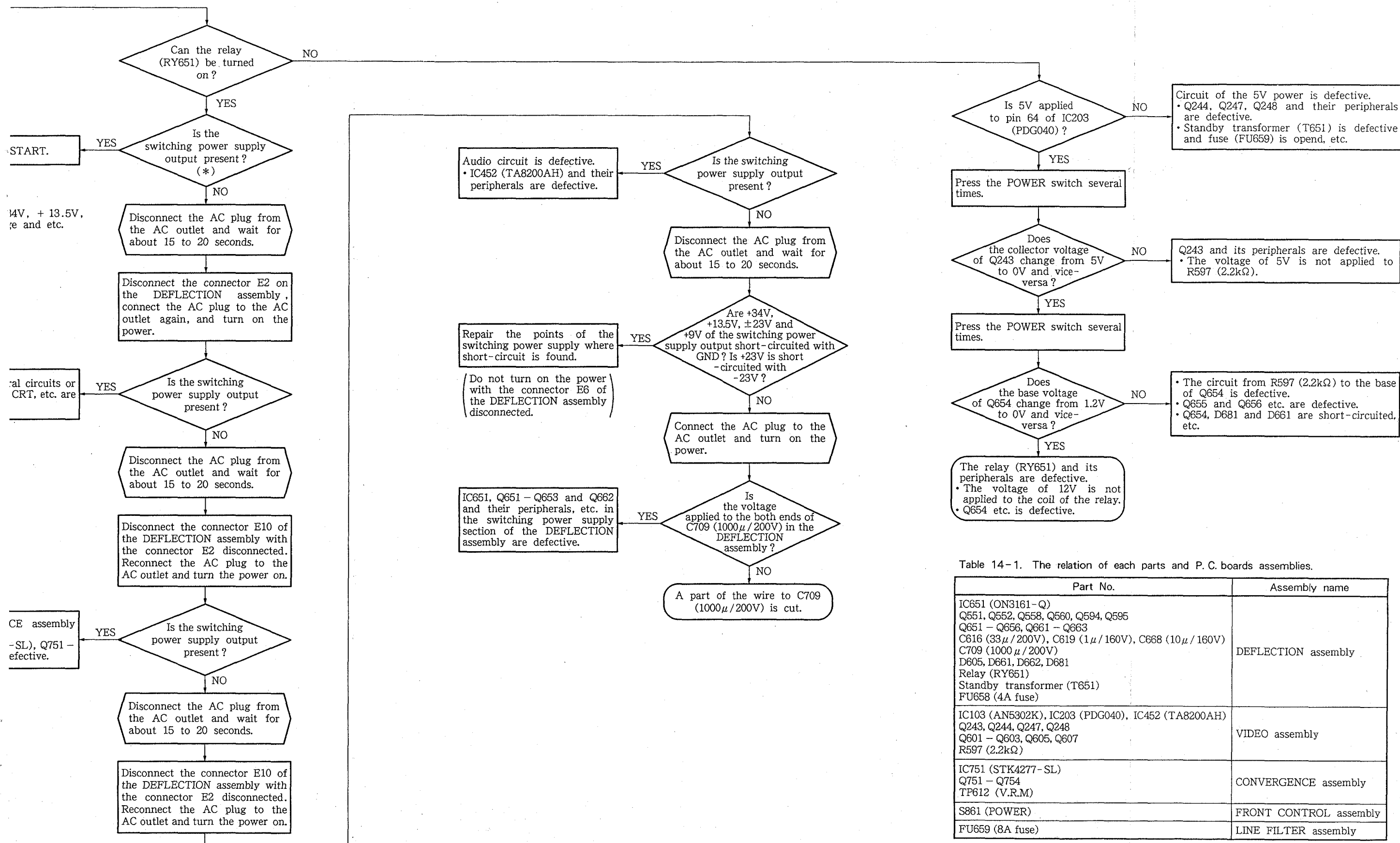


Table 14-1. The relation of each parts and P.C. boards assemblies.

Part No.	Assembly name
IC651 (ON3161-Q) Q551, Q552, Q558, Q560, Q594, Q595 Q651 - Q656, Q661 - Q663 C616 (33μ/200V), C619 (1μ/160V), C668 (10μ/160V) C709 (1000μ/200V) D605, D661, D662, D681 Relay (RY651) Standby transformer (T651) FU658 (4A fuse)	DEFLECTION assembly
IC103 (AN5302K), IC203 (PDG040), IC452 (TA8200AH) Q243, Q244, Q247, Q248 Q601 - Q603, Q605, Q607 R597 (2.2kΩ)	VIDEO assembly
IC751 (STK4277-SL) Q751 - Q754 TP612 (V.R.M)	CONVERGENCE assembly
S861 (POWER)	FRONT CONTROL assembly
FU659 (8A fuse)	LINE FILTER assembly

Note 1

To check if the anti-burning circuit of the CRT is activated

The following operation should be performed so that any protection circuits are not activated during operation. Therefore, the following care should be taken.

- Do not perform this operation except when checking to see if the circuit is activated or not.
- Perform the operation within a short period of time.
- Do not leave away from the set during operation.

To check

1. Disconnect the AC plug from the AC outlet. (For more than 15 to 20 seconds.)
2. Disconnect the connector E2 of the DEFLECTION assembly, so that the power is not fed to the CRT heater. (In order to protect the CRT and avoid X-ray emission.)
3. Short-circuit the both ends of D605 in the VIDEO assembly. (Or short-circuit the base and emitter of Q607.)
4. Connect the AC plug to the AC outlet and turn on the power. If the set is turned on, the anti-burning circuit of the CRT is active. Then you should immediately disconnect the AC plug from the AC outlet and open the short-circuit of the both ends of D605.

Note 2

To check if the X-ray protection circuit or the CRT heater voltage detection circuit are activated

The following operation should be performed so that any protection circuits are not activated during operation. Therefore, the following care should be taken.

- Do not perform this operation except when checking to see if the circuit is activated or not.
- Perform the operation within a short period of time.
- Do not leave away from the set during operation.

To check

1. Disconnect the AC plug from the AC outlet. (For more than 15 to 20 seconds.)
2. Disconnect the connector E2 of the DEFLECTION assembly, so that the power is not fed to the CRT heater. (In order to protect the CRT and avoid X-ray emission.)
3. Short-circuit TP561 and GND (TP556) in the DEFLECTION assembly.

4. Connect the AC plug to the AC outlet and turn on the power. If the set is turned on, either of the X-ray protection circuit or the CRT heater voltage detection circuit is active.
5. Measure the collector voltage of Q586 in the DEFLECTION assembly. If it is more than 1.2V, the X-ray protection circuit is active.
6. Measure the collector voltage of Q664 and Q665 in the DEFLECTION assembly. If it is more than 1.2V, the anti-burning circuit of the CRT is active. Then you should immediately disconnect the AC plug from the AC outlet and open the short-circuit of TP561 and GND (TP556).

Note 3

To check if the +135V power supply detection circuit is activated

The following operation should be performed so that any protection circuits are not activated during operation. Therefore, the following care should be taken.

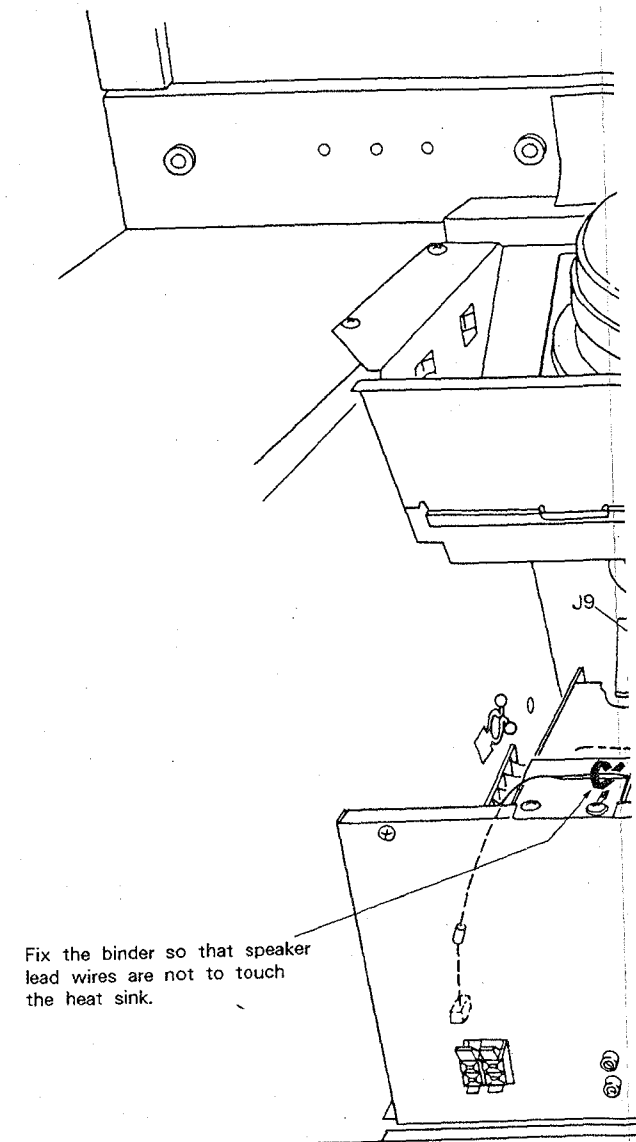
- Do not perform this operation except when checking to see if the circuit is activated or not.
- Perform the operation within a short period of time.
- Do not leave away from the set during operation.

To check

1. Disconnect the AC plug from the AC outlet. (For more than 15 to 20 seconds.)
2. Disconnect the connector E2 of the DEFLECTION assembly, so that the power is not fed to the CRT heater. (In order to protect the CRT and avoid X-ray emission.)
3. Short-circuit the lead of R291 (160k Ω), which is not connected to +135V power, in the DEFLECTION assembly (marked by A in the protection circuit block diagram) with GND.
4. Connect a DC voltmeter (capable of measuring 135V) between TP652 and GND in the DEFLECTION assembly.
5. While monitoring the DC voltmeter, connect the AC plug to the AC outlet and turn on the power. If the set is turned on and the DC voltmeter indicates less than 120V or more than 145V, the +135V power supply detection circuit is active. Then you should immediately disconnect the AC plug from the AC outlet and open the short-circuit between R291 (160k Ω) and GND.

15. WIRING DIAGRAM

When reassembling the wiring rods of this set once disassembled, be sure to recover the styling of wiring rods as it was. The wiring rods that are the most important for styling are the focus screen wires, the anode cable, and jumper wires connecting P2 to N3 and N2 to M3. The following wiring diagram is provided only for reference, and subject to possible changes without notice. Care should be taken so that the wiring rods styling of this set is recovered as it was before disassembling.



Do not touch
to the heat sink

15. WIRING DIAGRAM

When reassembling the wiring rods of this set once disassembled, be sure to recover the styling of wiring rods as it was. The wiring rods that are the most important for styling are the focus screen wires, the anode cable, and jumper wires connecting P2 to N3 and N2 to M3. The following wiring diagram is provided only for reference, and subject to possible changes without notice. Care should be taken so that the wiring rods styling of this set is recovered as it was before disassembling.

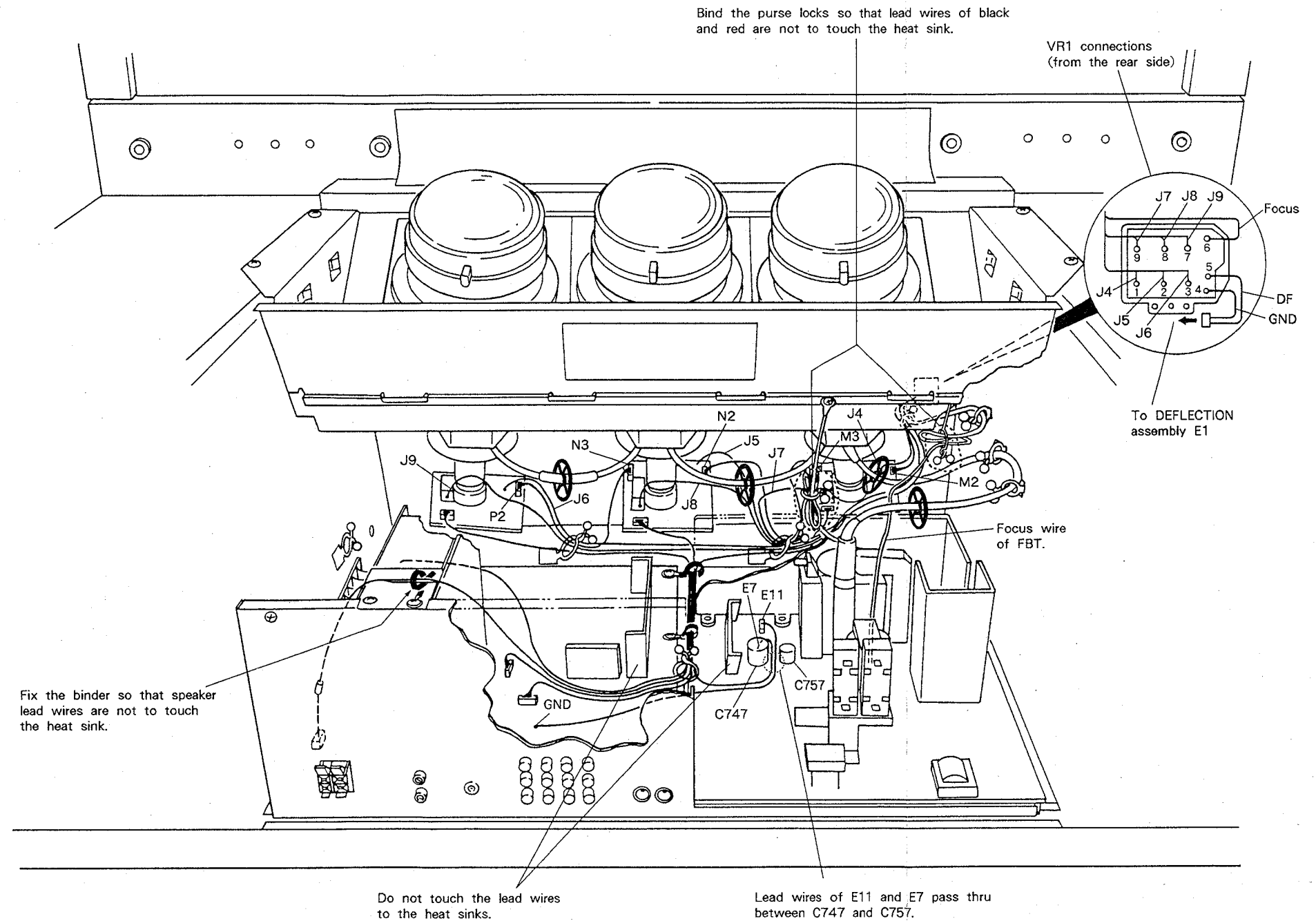


Fig. 15-1 Wiring diagram (1)

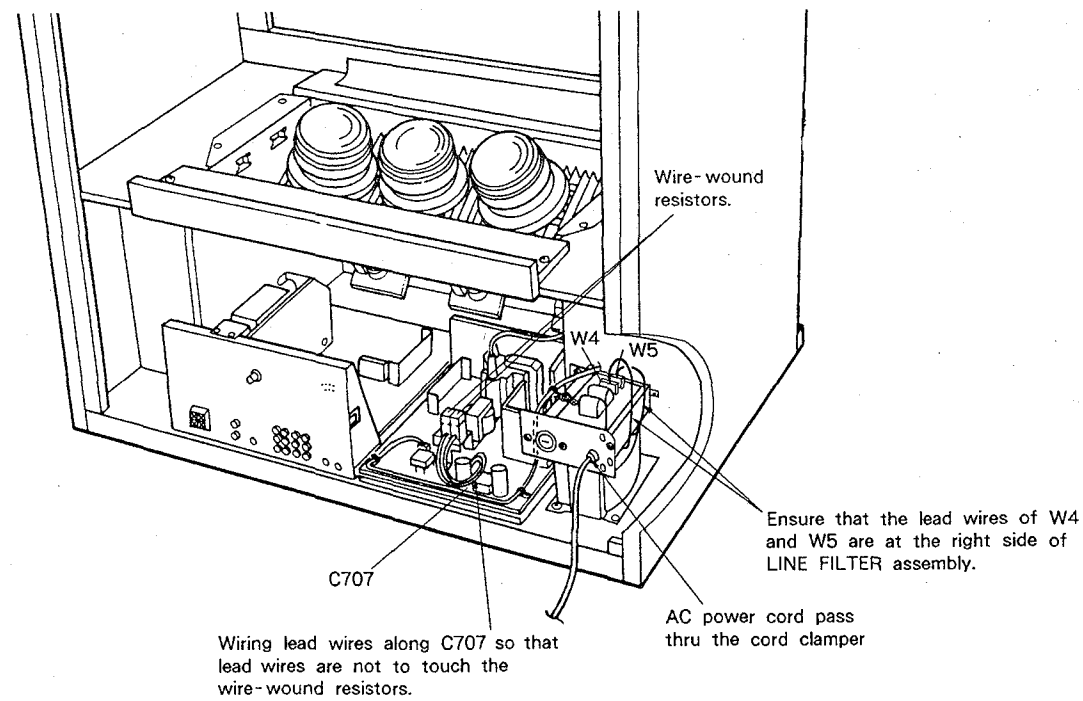


Fig. 15-2 Wiring diagram (2)

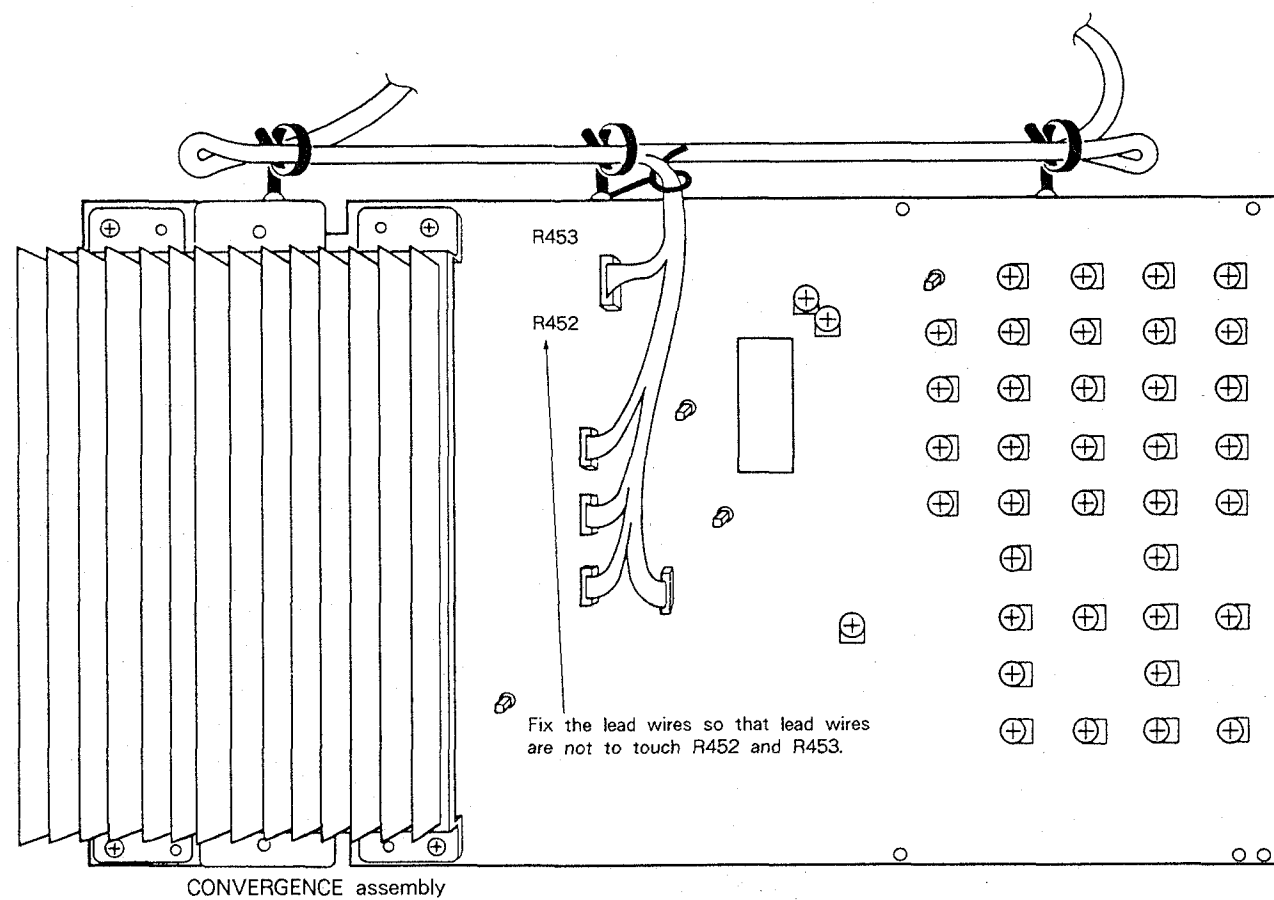


Fig. 15-3 CONVERGENCE assembly

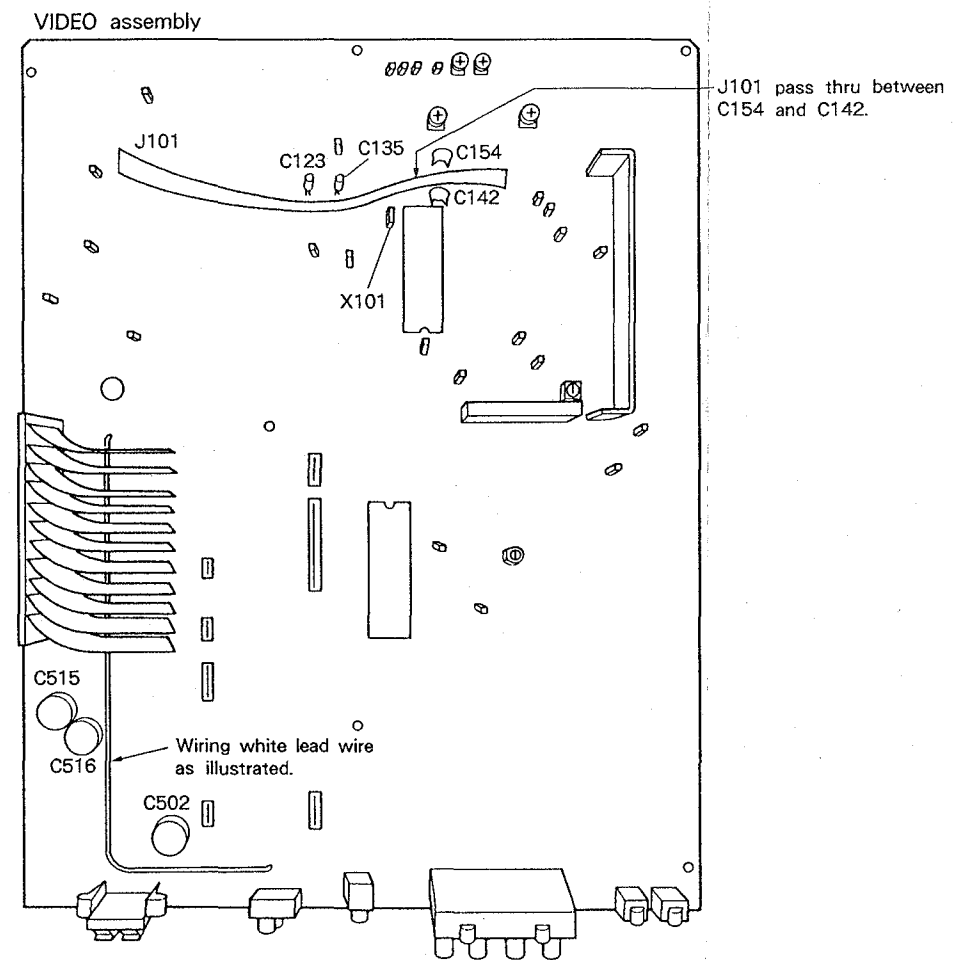


Fig. 15-4 VIDEO assembly

SD-P4003



PROJECTION MONITOR RECEIVER

SD-P4003

NTSC

**Operating
Instructions**

Congratulations on your purchase of the PIONEER Projection Monitor Receiver.

If you have not read the cautionary instructions enclosed with these operating instructions, please do so before proceeding.

After learning how to operate the Projection Monitor be sure to keep this manual handy for future reference.

Also, while the official name of the product is the "PROJECTION MONITOR RECEIVER," for the sake of brevity the text refers to it as the "Projection Monitor" or just the "Monitor."

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/LINE VOLTAGE SELECTOR SWITCH | 16 HOW TO ALIGN COLOR CONVERGENCE |
| 4 PRELIMINARY INSTRUCTIONS | 17 TV CHANNEL SELECTION |
| 5 FEATURES | 20 MULTI-CHANNEL TV SOUND (MTS) |
| 6 INSTALLATION | 21 TUNER PRESET |
| 7 INSERTING BATTERIES IN THE REMOTE
CONTROL UNIT | 22 PICTURE AND SOUND ADJUSTMENT |
| 7 OPERATING PRECAUTIONS | 23 AV MEMORY |
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| 10 REMOTE CONTROL FACILITIES | 24 BLOCK DIAGRAM |
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IMPORTANT NOTICE

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO WET LOCATIONS.

The model number and the serial number of this Projection Monitor are located on the rear panel. Please write the serial number on the enclosed warranty card and keep it in a safe place for future reference.

NOTE:

There are no user serviceable parts inside the Projection Monitor.

IMPORTANT



The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



CAUTION:
TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

LINE VOLTAGE SELECTOR SWITCH

Only the multi-voltage model is provided with this switch.

You will find the line voltage selector switch on the rear panel. Before your model is shipped from the factory, the switch is set to the power requirements of the destination; nevertheless, you should check that it is set properly before plugging the power cord into the AC outlet. If the voltage is not properly set, or if you move to an area where the voltage requirements differ, adjust the selector switch as follows. Before adjusting, disconnect the power cord.

1. Use a medium-size screwdriver.
2. Insert the screwdriver into the groove of the selector switch and turn until it points to the voltage value of your area.

VOLTAGE SELECTOR



PRELIMINARY INSTRUCTIONS

WHERE TO PUT THE MONITOR

LIGHTING

Bright lights or direct sunlight will dull the picture. Set the monitor so that the screen faces away from windows.

AIR CIRCULATION

Leave space for air to circulate behind the set. Keep away from curtains and other furnishings that could block ventilation.

HEAT DAMAGE

Damage may occur if you leave the set in direct sunlight or near a heater.

OPTIMUM VIEWING DISTANCE

10 to 23 feet is the range recommended for viewing comfort.

NEVER CONNECT THE PROJECTION MONITOR TO OTHER THAN THE SPECIFIED VOLTAGE, OR TO DIRECT CURRENT.

POWER OUTLET

- A damaged cord or plug is a fire hazard. If you notice wear or damage, have it fixed by qualified service personnel.
- Plug directly into the wall socket. Do not use extension cords or other receptacles. Do not overload the outlet; it may cause a fire hazard.

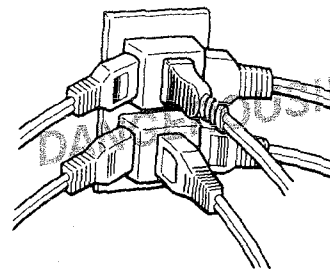
NOTE:

- Never remove the back cover of the Projection Monitor as this will expose you to dangerously high voltage and other hazards. If the set does not operate properly, unplug it and refer to page 25.

POWER-CORD CAUTION

Handle the power cord by the plug. Do not pull out the plug by tugging the cord and never touch the power cord when your hands are wet as this could cause a short circuit or electric shock. Do not place the unit, a piece of furniture, etc., on the power cord, or pinch the cord. Never make a knot in the cord or tie it with other cords. The power cords should be routed such that they are not likely to be stepped on. A damaged power cord can cause fire or give you an electrical shock. Check the power cord once in a while. When you find it damaged, ask your nearest PIONEER authorized service center or your dealer for a replacement.

• DANGEROUS



FEATURES

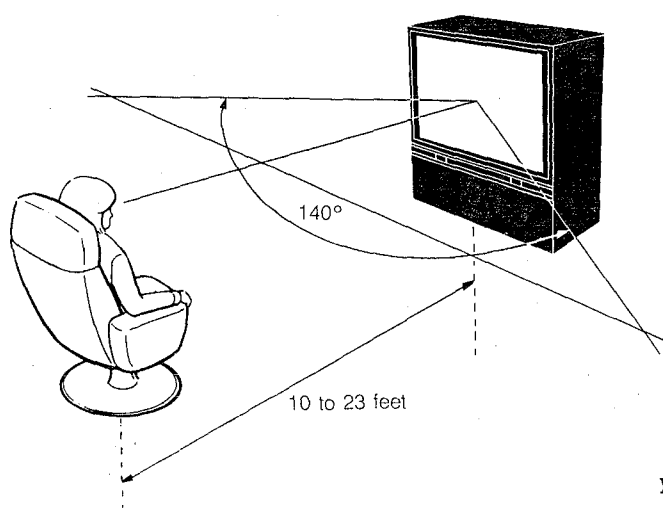
Sharp, Clear Images with 650-line Horizontal Resolution (Video input)

- Sharp detail and crisp outlines are realized, thanks to a 10MHz video bandwidth and Dynamic Picture Control circuitry.
- New, high-resolution picture tubes improve focusing performance.
- Dynamic focusing circuit enhances resolution at picture edges.

Improved Horizontal and Vertical Viewing Angles with Wide Viewing Range Screen

- 140° Horizontal Viewing Angle and 60° Vertical Viewing Angle.

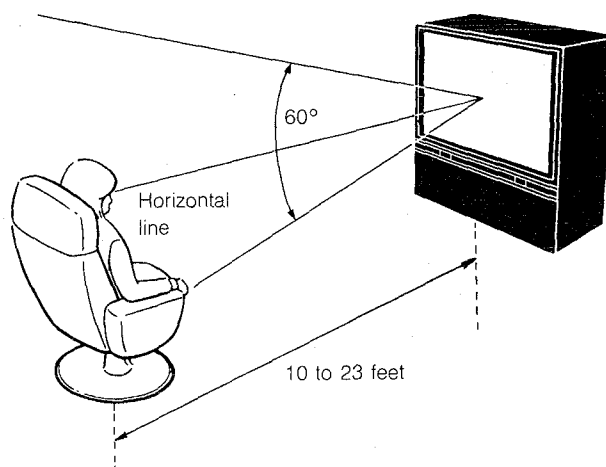
Best Horizontal Viewing Angle



Best Vertical Viewing Angle

Watch from at least ten feet (three meters) away from the screen.

(Optimum viewing distance is 10 to 23 feet.)



You may sometimes see double images or rainbowlike effects if you view from outside of the recommended area shown here.

Amazingly Bright Picture Intensity of 460 Foot-Lambert

- New, highly-efficient lens system passes more light.
- High-power picture tubes employ advanced anode stabilization circuitry and 6000pF capacitors.

Much Greater Contrast with Extended Gradation

- True black reproduction under all conditions, thanks to a Dynamic Black Level Correction Circuit.

Microcomputerized Dynamic Picture Optimizer (DPO)

- DPO (Dynamic Picture Optimizer) circuit detects room light and optimizes the TV picture accordingly.

AV Memory

- After adjusting the picture and sound quality, you can store your settings in "AV memory." Two AV memory settings can be stored and recalled.

INSTALLATION

ANTENNA CONNECTION

Connect to an outdoor antenna or a cable box or centralized antenna terminal. (See page 14 for details.)

MOUNTING

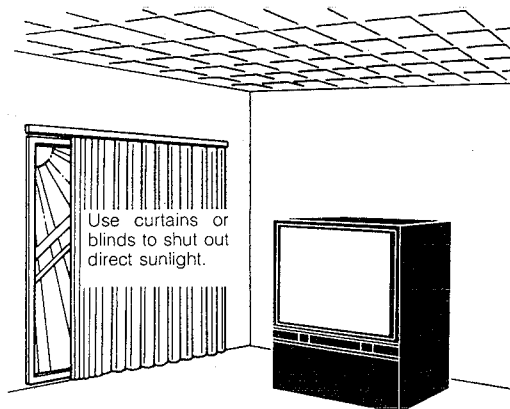
The Projection Monitor is designed to be placed on the floor or on a sturdy platform. The mounting surface should be flat and steady.

INSTALLATION PRECAUTIONS:

Place of Installation

- When the Projection Monitor is operating, it is cooled by air-flow through ventilation holes in the rear and bottom. Therefore, avoid placing it in a location where the cooling air-flow is hindered (for example, against a wall).
- Avoid places subject to extremely high temperatures or humidity, or to temperatures of 41°F (5°C) or lower. Also avoid dusty places.
- Do not set the Projection Monitor in an unstable location (such as on a shaky or a tilted platform).
- When setting the Projection Monitor on a floor of soft material, make sure that the floor material is not damaged by the weight of the Projection Monitor.
- If the room temperature suddenly rises (or if the Projection Monitor is moved from a cool place to a hot place), dew condensation may occur on the lenses, resulting in picture distortion or color fading. In such a case, simply wait a while (with the POWER SWITCH on) and the dew will disappear.

Downward spot lights or fluorescent lights in an overhead "Honey-comb" prevent direct illumination of the screen.



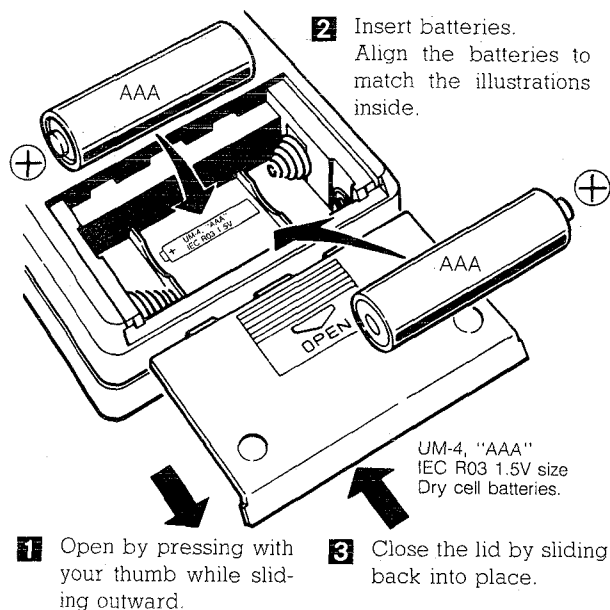
Cover shiny surfaces (floor and walls) with non-reflective materials, (carpet, rugs, wallpaper, etc.).

INSERTING BATTERIES IN THE REMOTE CONTROL UNIT

You will find the remote control unit packed inside the projection monitor box. Open the remote control unit and insert the batteries. Follow the procedure below:

- 1** Open the battery compartment on the rear of the remote control unit. Press down with your thumb while sliding the lid outward.
- 2** Note the polarity (+ and -) markings in the case. Insert the supplied batteries so that they match the markings.
- 3** Close the lid by sliding it back in until it clicks into place.

INSERTING BATTERIES



OPERATING PRECAUTIONS

Keep away from magnetic fields

The picture may be distorted if strong magnetic fields are nearby. External speakers should be set at least two feet (60cm) away from the Projection Monitor. Electric fans and other motor driven appliances and toys may also be sources of magnetism.

When moving the monitor

Pull out the plug and move the set carefully. Be particularly careful not to bump or scratch the screen. To avoid damage to the casters you may need to lift the set when going over irregular surfaces.

Install in a flat, steady place

Do not put the Projection Monitor on a surface that is tilted, unsteady or prone to shake or vibrate. A shaky or slanted platform is dangerous.

Adjust room illumination

Excessively bright or dim lighting may strain your eyes. Draw the curtains if necessary to shut out direct sunlight.

When not using the set for a long time

For safety, unplug the power cord when leaving the set turned off for a long period of time.

Dew (condensation) and picture blurring

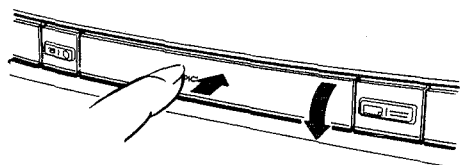
- You may see a blurred picture if the set is moved from a cool to a warm location or if room temperature rises very rapidly. This occurs when moisture from the air condenses on the optical parts.
- The picture will return to normal if you leave the set turned on for an hour or two.
- A gradual change in temperature can prevent dew formation.

FRONT PANEL FACILITIES

A flip-down door conceals the control panel. Push gently and release to open the door.

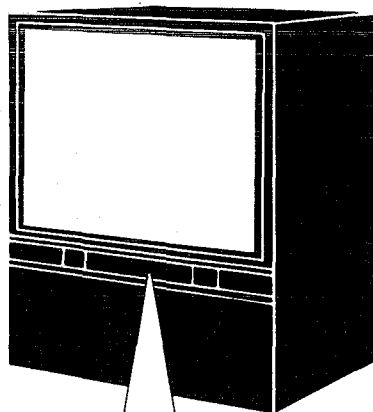
To close the door, lift it back up into place.

Push and release to open.

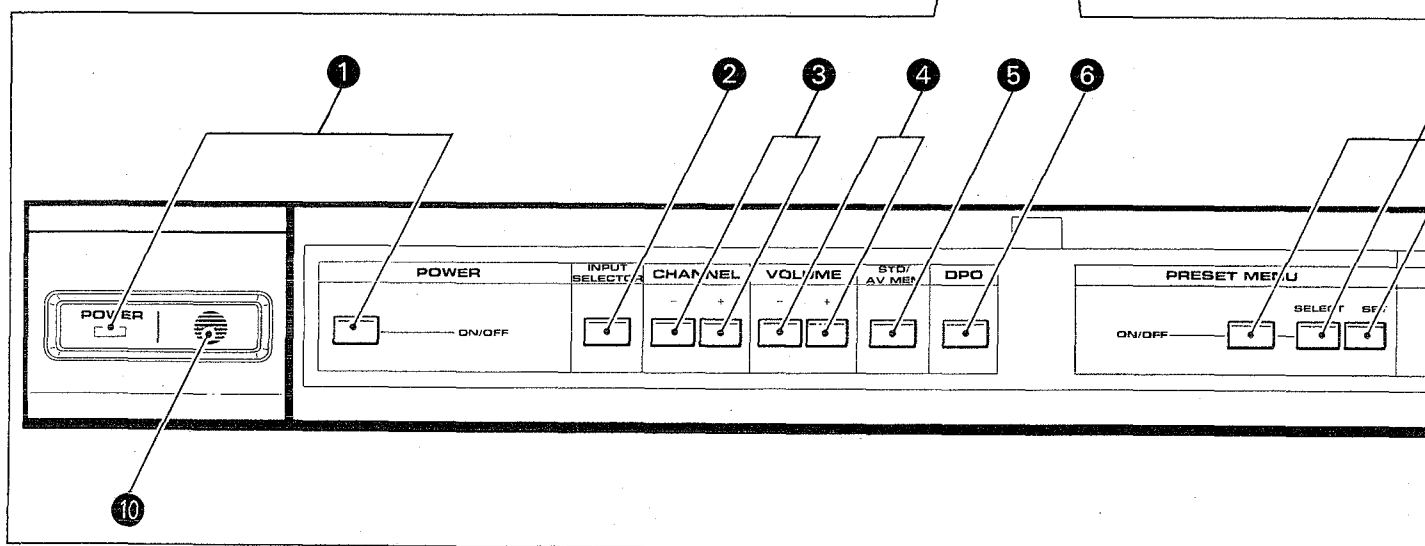


NOTE:

- If you accidentally pull the door open, it may not shut properly. Push in when shutting the door to restore normal operation.

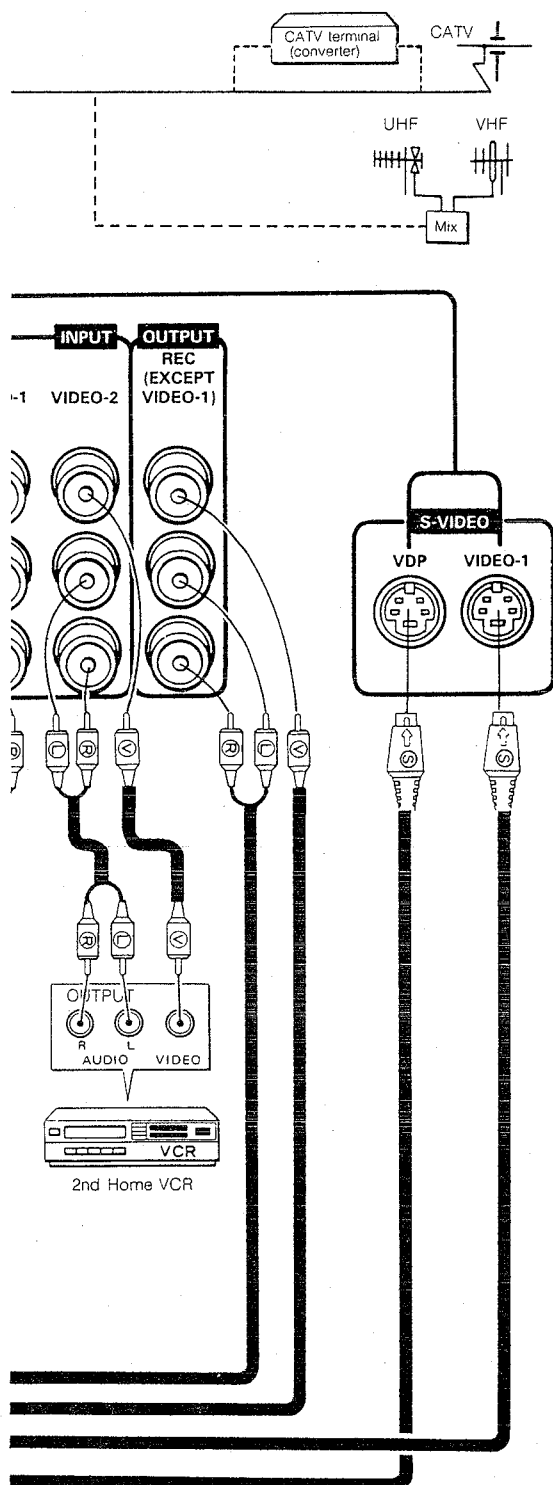


Control Panel



- ★ Use the remote control unit to operate most functions.
See page 10.

SYSTEM CONNECTION DIAGRAM

**INPUT JACKS**

These are three sets of inputs for VCRs, LaserVision players, and other video sources. Use RCA-type pin plug cords (same as those used in hi-fi systems) for connections.

When the audio source to be connected is monaural, connect the source to the L-(MONO) jack.

OUTPUT REC-JACKS

These are used for connecting a VCR for recording, or for linking to another monitor. These jacks output the video and audio signals of the source currently selected by the INPUT SELECTOR.

If you have one VCR, connect these output jacks to your VCR's inputs. Connect the VCR's outputs to the monitor's VIDEO-1 inputs.

NOTE:

- If a VCR is connected to the VCR2 input, then that VCR should not be connected to these outputs. The design of some VCRs causes an oscillation feedback loop in such situations.

CONTROL OUT JACK

This jack is used to extend remote control to other PIONEER equipment bearing the  (System Remote) mark.

Use mono miniplug cords (available at audio and video shops) to connect the monitor's CONTROL OUT jack to the CONTROL IN jack of the other unit. The other unit can be connected to still another in the same manner, from the CONTROL OUT jack of one to the CONTROL IN jack of the other. If a unit has only a CONTROL IN jack then put that unit last in the sequence. Otherwise, you may connect in any order that is convenient.

If another unit has the  mark and its own remote control sensor, then the CONTROL OUT/IN jack connection is not required. However, this connection may improve the response of remote control, since you will not need to point the remote control unit at different components. (See page 14.)

AUDIO OUTPUT (VARIABLE) JACKS

These jacks output the audio signal from the video program material currently selected for viewing on the monitor. Connect these audio output jacks to the AUX input jacks of your stereo system. You can then use the remote control unit to adjust the volume.

S-VIDEO INPUT JACKS

Use the S-VIDEO VIDEO-1 jack for input of S-VHS or ED Beta VCR video signals.

Use the S-VIDEO VDP jack for inputting signals from a LaserVision player having S output jack.

When making S-VIDEO connections for either a VCR or a LaserVision player, be sure to also keep the standard VIDEO and AUDIO connections between the VCR/LaserVision player and the Projection Monitor.

SPEAKER SELECTOR

This lets you select either the built-in speaker or external speakers. (See page 15.)

NOTE:

- Set to INT when using the built-in speakers. Do not use the INT setting if using speakers connected to the EXTERNAL SPEAKER terminals on the rear panel. At the INT setting, no sound is output from the external speakers.
- Set to EXT when using external speakers (or if you will be directing the output through your stereo system). At the EXT setting, no sound is output from the internal speakers.

EXTERNAL SPEAKERS TERMINALS (R, L)

For connection of external speakers (purchased separately).

ANTENNA CONNECTIONS

A good color picture depends on a good TV signal. So does good multi-channel (stereo and SAP) sound. To assure the highest signal quality, choose an antenna that suits your reception area and have it properly installed. Ask your dealer for advice.

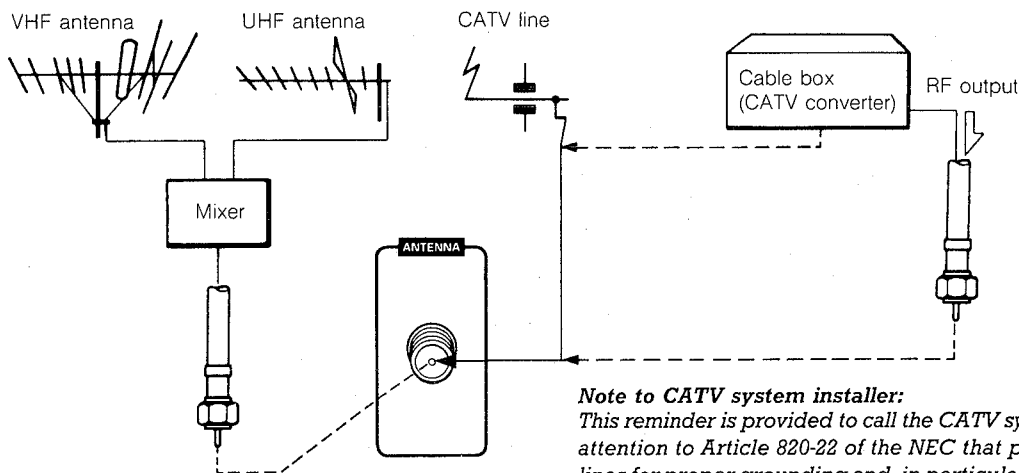
Of course, if you will be subscribing to cable or have a central antenna for your building, then you will not need an external antenna.

However, proper connections from your TV signal source to your monitor are essential. Please refer to the instructions below.

USING THE ANTENNA CABLE CONNECTOR

The cable connector plugs into the monitor's antenna terminal. This unit is designed to connect to a 75 ohm coaxial cable using an F-type plug.

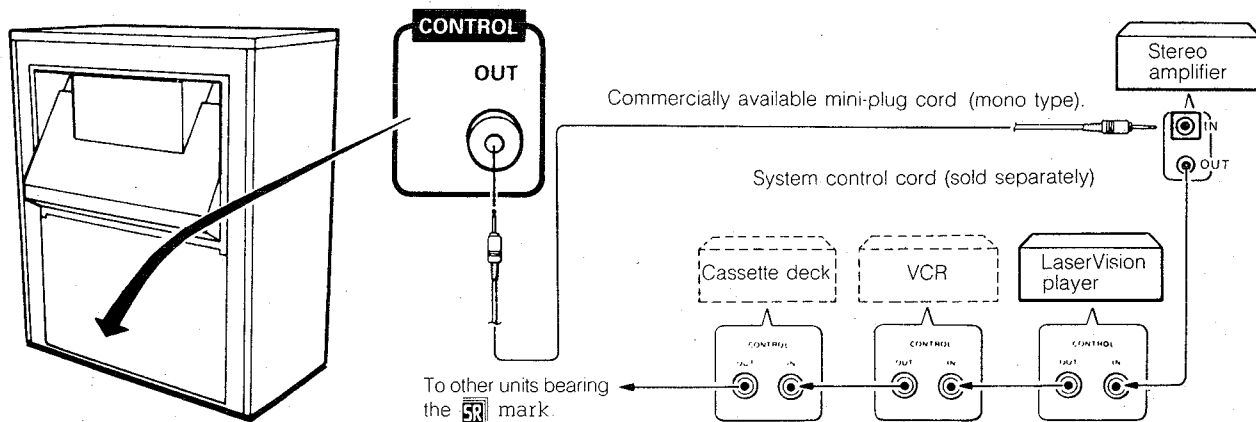
Connect the cable box output or the antenna cable connector into the ANTENNA terminal.



Note to CATV system installer:
This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground should be connected to the grounding system of the building, as close to the point of cable entry as practical.

SYSTEM REMOTE CONTROL CONNECTIONS

Many PIONEER audio and video components can be connected to allow remote control of an entire audio/video system. Use mini-plug cords (monaural) which may be purchased in most audio and video stores. Connect from the CONTROL OUT jack of one unit to the IN jack of the next unit.

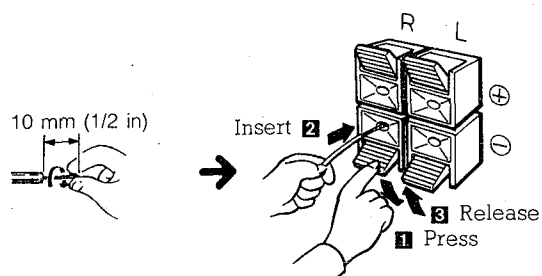


SPEAKERS

CONNECTING EXTERNAL SPEAKER WIRES

Strip each wire so that about half an inch is exposed. Twist the core.

Turn off the power of the monitor and connected equipment. Press the lever, insert the wire, and release the lever to lock the wire into place. Pull gently on the wire to check that it is securely connected.



Do this for each wire. Be careful to connect the right speaker's plus and minus terminal wires to the "R" "+" and "-" terminals. Likewise, connect the left speaker's plus and minus terminal wires to the "L" "+" and "-" terminals.

Precautions

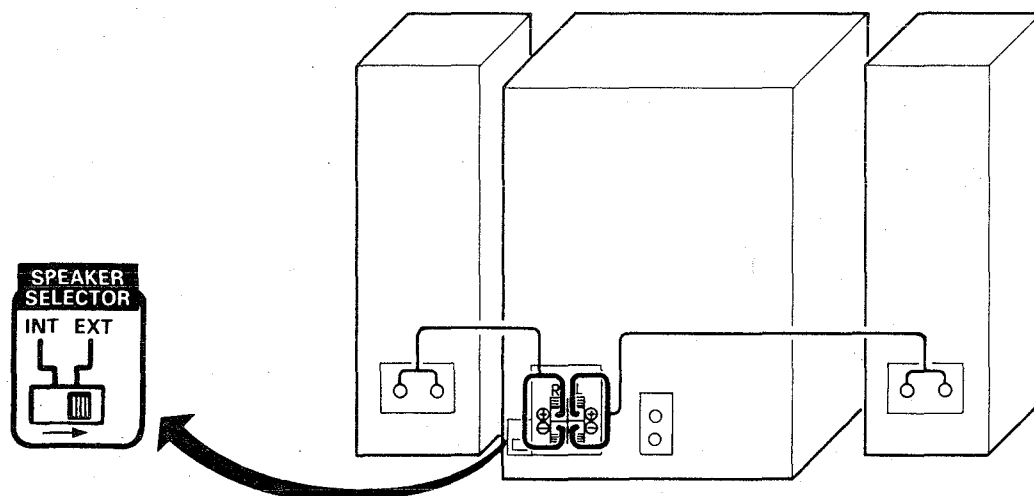
- Be sure that exposed wires do not protrude and touch each other.
- If you do not hear a normal stereo image when listening to a stereo program, it may be because the "+" and "-" connections are reversed for one of the external speakers.
- Be sure that the right speaker is connected to the "R" terminals and the left speaker to the "L" terminals. Be sure that each speaker's two wires are properly connected to the appropriate "+" and "-" terminals.

NOTES:

- Use speakers having an impedance rating of from 8 ohms to 16 ohms. Speakers having less than 8 ohms impedance may draw excessive current, triggering the monitor's protection circuit. The protection circuit cuts off output to prevent damage in case of short circuits or abnormally low impedance.
- Ordinary speakers are not magnetically shielded and may disturb the picture if placed too close to the monitor. Move the speakers about two feet away from the monitor if you notice a problem.

SPEAKER SELECTOR

Set this to the INT position if you will be listening to the built-in speakers. If you have connected external speakers (or if you will be listening through your stereo system), then you can turn off the built-in speakers by setting the selector to the EXT position.



HOW TO ALIGN COLOR CONVERGENCE

This Projection Monitor uses three separate TV tubes. There are a red tube, a green tube, and a blue tube. The red, green and blue images are projected onto the screen where they converge to form a full color picture. If they do not converge correctly, then you see colored borders around the images.

Your dealer should adjust the color convergence when your set is delivered. However, convergence may drift over time or if you move the set.

Follow the steps below if color convergence alignment is needed.

- 1** Turn on the power and select an active channel. Wait a moment for the picture to stabilize.
- 2** Press the MENU ON/OFF button on the control panel. The monitor screen displays the menu (CONVERGENCE, AV MEMORY, TV-CATV MODE, and TUNER PRESET). Make sure that "CONVERGENCE" is displayed in red. If not, press the MENU SELECT button so that "CONVERGENCE" turns red.
- 3** Press the MENU SET button on the control panel. If color convergence is correct, there will be one vertical white line and one horizontal white line, as in figure 1.
- 4** If you see separate colored lines, use the R/B, ◀, ▶, ▲, and ▼ keys on the remote control unit to make the red and blue lines disappear into the other lines. Each time the R/B key is pressed, the line (red or blue) to be controlled changes alternately. Pressing the ◀ key moves the vertical line to the left, while pressing the ▶ key moves the vertical line to the right. Pressing the ▲ key moves the horizontal line upward, while pressing the ▼ key moves the horizontal line downward. In figure 2, for example, press the R/B key to control the red line, and then press the ◀ key so that the red line converges. Press the R/B key again to control the blue line, and then press the ▼ key so that the blue line converges. Convergence is correct when all three colors (red, green, and blue) converge, producing single white lines.
- 5** Press the MENU ON/OFF button twice when convergence is correct.

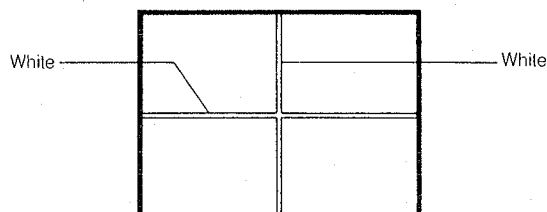
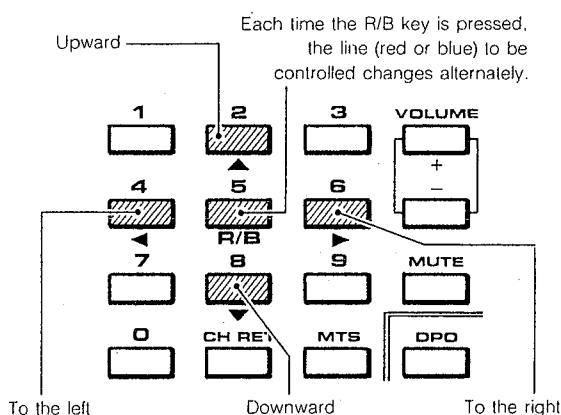
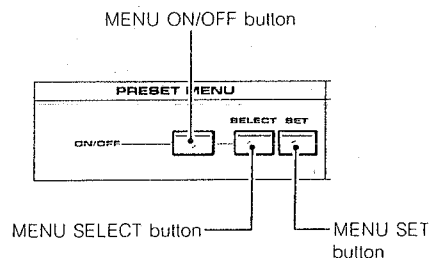


Fig. 1 Correctly aligned

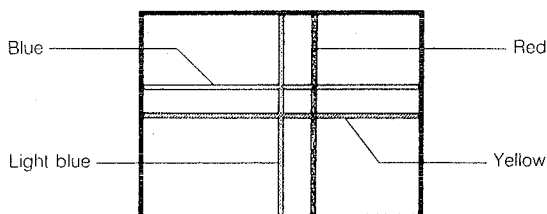


Fig. 2 Horizontally and vertically misaligned

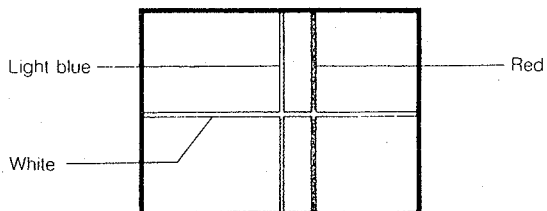


Fig. 4 Horizontally misaligned

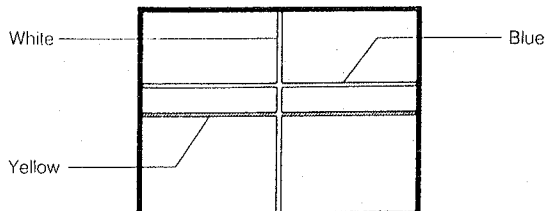


Fig. 3 Vertically misaligned

TV CHANNEL SELECTION

The Projection Monitor uses a frequency synthesizer tuning system to permit reception of up to 127 channels (including cable channels). This electronic tuning system gives you two ways of selecting channels. You can use the remote control keys numbered "0" through "9" to directly input the channel number.

Or you can use the two CHANNEL keys marked "+" and "-" on the remote control unit or the CHANNEL buttons marked "+" and "-" on the control panels to select one channel after another. In this case, you can remove or add channels so that "TUNER PRESET" contains only those channels that you usually watch.

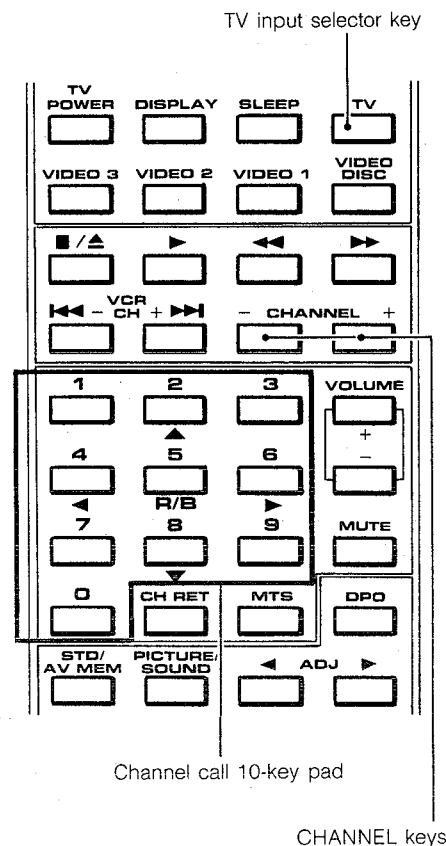
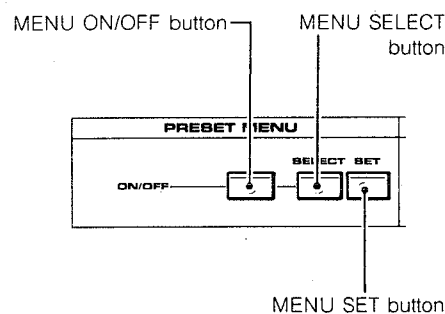
The 127 possible channels include broadcast TV channels 2-13 (VHF), 14-69 (UHF), as well as cable (CATV) channels 1-13 (VHF), 14-22 (mid-band), 23-36 (super-band), 37-65 (hyper-band), and 94-99 (mid-band).

NOTE:

• **TUNER PRESET** refers to channel access by pressing the CHANNEL keys marked "+" and "-." You can specify which channels are to be included in TUNER PRESET before using this function. Details follow.

BROADCAST TV CHANNEL SELECTION (When the VHF/UHF antenna is connected to the ANTENNA terminal on the rear panel.)

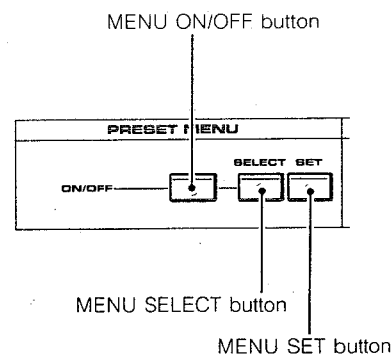
- 1 Press the INPUT SELECTOR button so that "TV CHXX" appears on the monitor screen, or press the TV input selector key on the remote control unit.
- 2 Select channels directly by pressing the channel number on the remote control "CHANNEL CALL" 10-key pad. For example, to receive channel "23," press 2 and then 3. For channels 2 through 9, first press zero, then the number. Or just press the number and wait for about four seconds.
(While waiting for you to input a second digit, the first digit blinks. If you do not input a second digit within four seconds, then the first digit is selected as the channel number.)
- 3 Channel memory selection is also possible. Using the CHANNEL keys marked "+" and "-" on the remote control unit or CHANNEL buttons marked "+" and "-" on the control panel you can scan through the channels which are in tuner preset. To add or delete channels in memory, see TUNER PRESET on page 21.



TV CHANNEL SELECTION

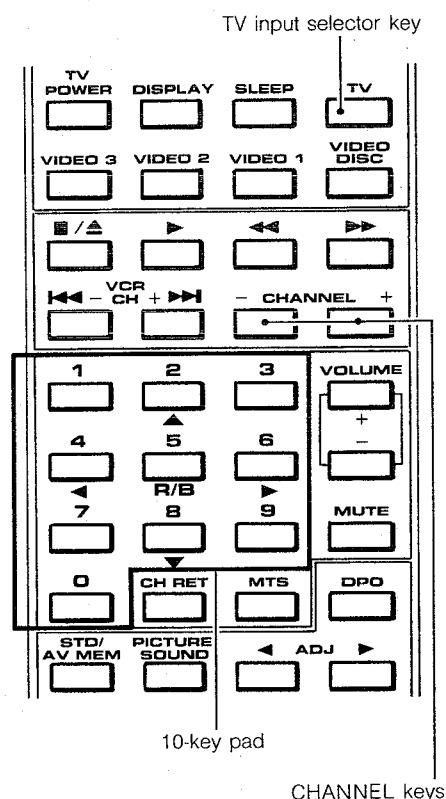
PRESETTING YOUR CATV SYSTEM (When the cable box output is connected to the ANTENNA terminal on the rear panel.)

- 1 Press the INPUT SELECTOR button so that "TV CHXX" appears on the monitor screen, or press the TV input selector key on the remote control unit.
- 2 Turn on the menu with the MENU ON/OFF button and press the MENU SELECT button so that the TV-CATV MODE display turns red.
- 3 Press the MENU SET button. "AIR," "STD" or "HRC" appears on the screen.
- 4 Select "STD (standard)" or "HRC" with the MENU SET button. (Ask your dealer or cable service provider which is correct for your local CATV system.) Each press of the MENU SET button moves the selection from AIR to STD, to HRC, and then back around to AIR again.
Then displayed mode ("STD" or "HRC") is now preset in the ANTENNA memory, so you can receive your local CATV broadcast when the TV is turned on.
- 5 Press the MENU ON/OFF button twice (or once) to return to normal operation.

**CABLE (CATV) CHANNEL SELECTION**

It is necessary to preset your local CATV system in ANTENNA memory. For presetting your CATV system, see "PRESETTING YOUR CATV SYSTEM."

- 1 Press the INPUT SELECTOR button so that "TV CHXX" appears on the monitor screen, or press the TV input selector key on the remote control unit.
- 2 Select channels directly by pressing the channel number on the remote control 10-key pad. For example, to receive channel "23," press the 2 and then 3. For channels 1 through 9, first press zero, then the number. Or just press the number and wait for about four seconds. Note that channel numbers "00," and "66" through "93" are not assigned. So the selected channel will not change if you input these numbers.
You can select VHF channels (1-13), mid-band channels (A1-A6, A-I), super-band channels (J-W), and hyper-band channels (AA-CCC). Refer to the standard cable channel assignment table shown here. Your local service provider's channel assignments may differ from those shown in the table.
- 3 Channel memory selection is also possible. Using the CHANNEL keys marked "+" and "-" on the remote control unit or the CHANNEL buttons marked "+" and "-" on the control panel you can scan through the channels in channel memory. To add or delete channels in memory, see TUNER PRESET on page 21.



TV CHANNEL SELECTION

CABLE (CATV) CHANNEL ASSIGNMENT TABLE

Channel number assignment for the cable tuning mode begins with 01 through 65, omits the unassigned numbers 66 through 93, then proceeds from 94 through 99. The specific channel number assignments and the corresponding alphabetical designation are shown below in the channel table.

	VHF L	MID		VHF H	SUPER	HYPER			UHF
TV	2 ~ 6	—		7 ~ 13	—	—			14 ~ 69
CATV	2 ~ 6 (STD)	A-6 (94)	A (14)	7 ~ 13	J (23) Q (30)	AA (37)	KK (47)	TT (56)	—
		A-5 (95)	B (15)		K (24) R (31)	BB (38)	LL (48)	UU (57)	
		A-4 (96)	C (16)		L (25) S (32)	CC (39)	MM (49)	VV (58)	
		A-3 (97)	D (17)		M(26) T (33)	DD (40)	NN (50)	WW (59)	
		A-2 (98)	E (18)		N(27) U (34)	EE (41)	OO (51)	XX (60)	
		A-1 (99)	F (19)		O(28) V (35)	FF (42)	PP (52)	YY (61)	
	1 ~ 6 (HRC)		G (20)		P (29) W(36)	GG (43)	QQ (53)	ZZ (62)	
			H (21)			HH (44)	RR (54)	AAA (63)	
			I (22)			II (45)	SS (55)	BBB (64)	
						JJ (46)		CCC (65)	

For example: Channel number "14" corresponds to mid-band cable channel "A."

NOTE:

- Cable (CATV) services can vary from area to area. The channel number assignments shown in the channel table may not correspond with the channel numbers used by your local cable company. Direct tuning to cable channels without the use of the cable company "converter" or "preselector" will depend on the specific channels in use by the cable company. Direct tuning to cable channels is limited to unencoded (unscrambled) channels only. Check your local cable company compatibility requirements.

MULTI-CHANNEL TV SOUND (MTS)

A multi-channel TV sound decoder is built into the Projection Monitor.

This MTS decoder permits stereo and SAP sound reception. (SAP is a "second audio program" often used for a second language.) The MTS decoder is only effective if the broadcast includes stereo or SAP signals.

NOTE:

• Broadcast stereo and SAP reception operate in accordance with the Broadcast Television Systems Committee (BTSC) standard only. Stereo audio transmission from CATV (Cable television) systems can vary from area to area and may not be compatible with the BTSC standard.

Check with your local cable company for specific compatibility requirements.

STEREO RECEPTION

If necessary, use the remote control MTS key to switch to the MAIN setting. The set will switch automatically between mono and stereo according to the signals received.

NOTE:

The MTS display is shown on the screen when the channel is tuned or the DISPLAY key on the remote control unit is pressed.

SAP (SECOND AUDIO PROGRAM) RECEPTION

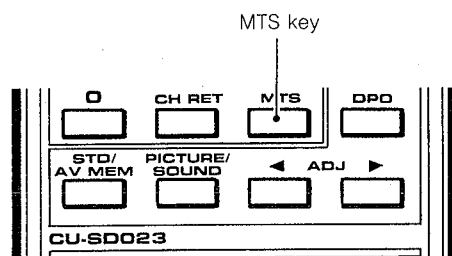
TV stations have the option of broadcasting a second audio program (SAP) signal. This additional sound channel accompanies another mono signal or stereo signal. However, the SAP sound itself is in mono.

Use the MTS key to switch to the SAP or MAIN/SAP setting if you wish to hear "second audio program" sound. (At the MAIN/SAP setting, the SAP sound will come from the right stereo speaker while the left speaker produces the main sound signal.)

You will still hear stereo or mono sound when there is no SAP signal.

MONO RECEPTION

You can force monophonic reproduction of all programs by using the MTS key to select MONO.

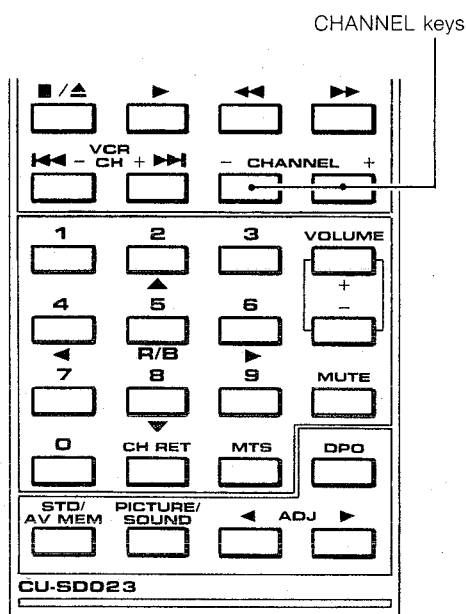
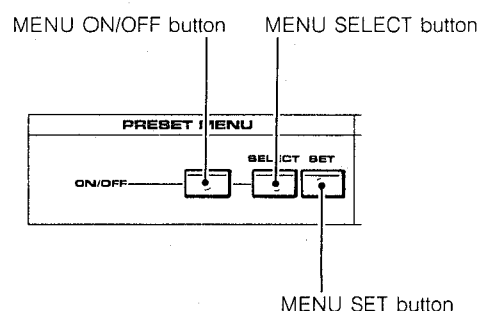


Audio Reception Mode Display (selected by the MTS key)

Broadcast mode Mode selected		MONO	STEREO	MONO + SAP	STEREO + SAP
MAIN	Display	TV CH ○ ○	TV CH ○ ○ STEREO	TV CH ○ ○ MAIN	TV CH ○ ○ STEREO <SAP>
	REPRODUCTION Mode	MONO	L, R	MONO (MAIN)	L, R
SAP	Display	TV CH ○ ○	TV CH ○ ○ STEREO	TV CH ○ ○ SAP	TV CH ○ ○ SAP <ST>
	REPRODUCTION Mode	MONO	L, R	SAP	SAP
MAIN/SAP	Display	TV CH ○ ○	TV CH ○ ○ STEREO	TV CH ○ ○ MAIN/SAP	TV CH ○ ○ MAIN/SAP <ST>
	REPRODUCTION Mode	MONO	L, R	L. MONO (MAIN) R. SAP	L. MONO (MAIN) R. SAP
MONO	Display	TV CH ○ ○ MONO	TV CH ○ ○ MONO	TV CH ○ ○ MONO	TV CH ○ ○ MONO
	REPRODUCTION Mode	MONO	MONO	MONO (MAIN)	MONO (MAIN)

TUNER PRESET

You can customize this special tuning system so that it will select only your personal choice of channels. When the Projection Monitor leaves the factory, all possible channels are in TUNER PRESET. Using the menu function you can add or delete channels to or from TUNER PRESET. You can freely add and delete channels as you like.



OTHER MEMORY FEATURES

The Projection Monitor also remembers many other settings related to day-to-day operation. So when you turn the set on, it comes up with your previous channel and volume settings. It also remembers your previous picture quality settings.

TUNER PRESETTING

TUNER PRESET can be set to match your personal preferences among the channels available in your area. Please refer to your local TV or cable program guide. Follow the procedures below to customize TUNER PRESET to your requirements.

Removing Channels from TUNER PRESET

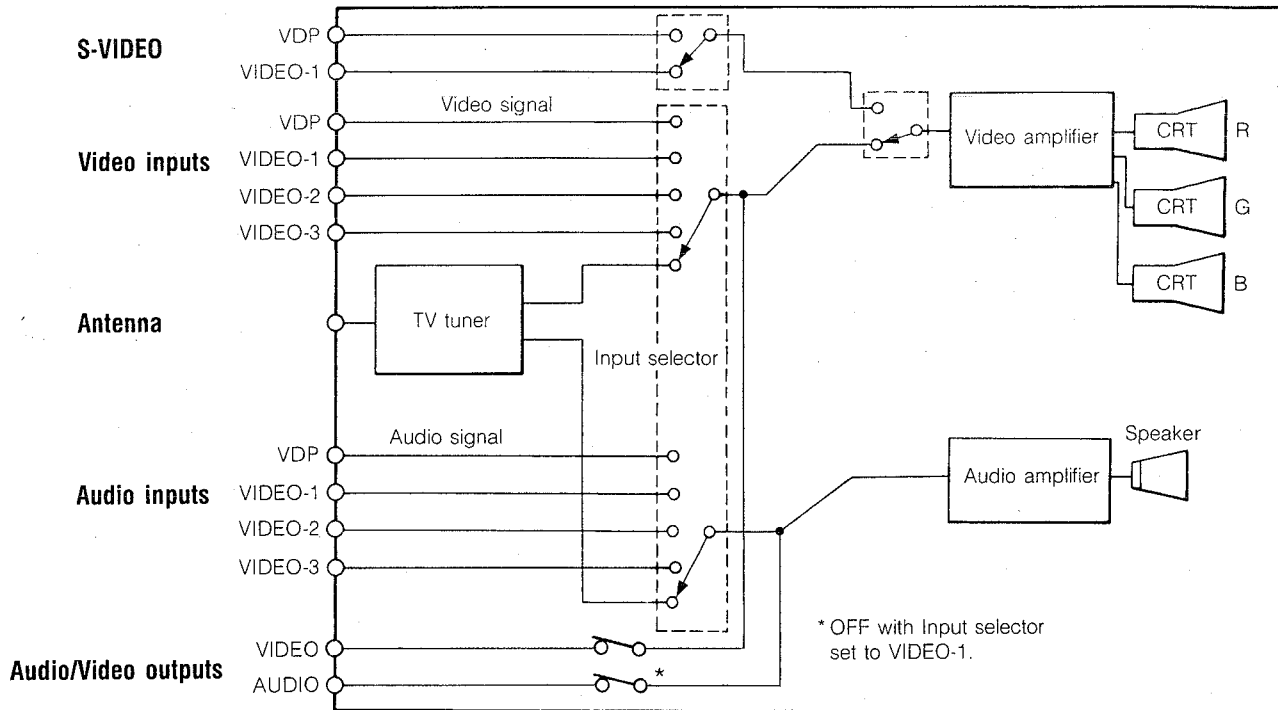
- 1** Turn on the monitor.
- 2** Turn on the MENU ON/OFF button, and press the MENU SELECT button so that the TUNER PRESET display turns red.
- 3** Press the MENU SET button. The channel numbers appear on the screen.
- 4** Press the MENU SELECT button or the CHANNEL - or + button so that the channel number to be deleted blinks. (The preset channel numbers are displayed in green.)
- 5** Press the MENU SET button to delete the currently selected channel from TUNER PRESET. The blinking number turns red. The red numbers show the deleted channel numbers.
- 6** Repeat steps **4** and **5** to delete additional undesired channels.
- 7** Press the MENU ON/OFF button twice after presetting is completed.

Adding channels to TUNER PRESET

- 1** Turn on the monitor.
- 2** Turn on the MENU ON/OFF button, and press the MENU SELECT button so that the TUNER PRESET display turns red.
- 3** Press the MENU SET button. The channel numbers appear on the screen.
- 4** Press the MENU SELECT button or the CHANNEL - or + button so that the channel number to be added blinks. (The deleted channel numbers are displayed in red.)
- 5** Press the MENU SET button to add the currently selected channel to Tuner Preset. The blinking number turns green. The green numbers show the added channel numbers.
- 6** Repeat steps **4** and **5** to add additional desired channels.
- 7** Press the MENU ON/OFF button twice after presetting is completed.

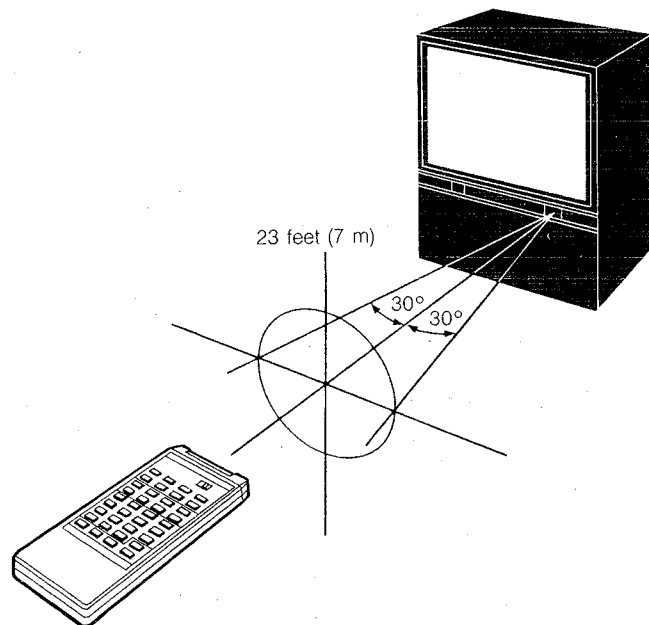
Now you can recall the preset channels by pressing the remote control CHANNEL "+" and "-" keys or the control panel CHANNEL "+" and "-" buttons.

BLOCK DIAGRAM



REMOTE CONTROL OPERATION RANGE

- Point the remote control unit toward the front of the Projection Monitor when you press any of the control keys.
- The remote control unit should be effective at distances of up to about 23 feet (7 meters) from the Projection Monitor and at angles of up to about 30 degrees from a line perpendicular to the front panel.
- Furniture and other obstacles may block the infrared light beam so that it cannot reach the sensor on the Projection Monitor's front panel.
- If there is no response even when the remote control is used directly in front of the Projection Monitor, the alkaline dry cell batteries may need replacement. (See page 7.)



TROUBLESHOOTING

Please check the following chart and try the suggested solutions before consulting a PIONEER authorized service center.

Often you can fix the problem by making a simple adjustment on the Projection Monitor. Faulty connections may be to blame. Or it may be another piece of equipment that is causing the trouble.

SYMPTOM	POSSIBLE CAUSE AND SUGGESTED SOLUTION
NO PICTURE	AC power cord is not plugged into the wall socket. Plug in the AC power cord. Power switch is off. Turn on the power switch on the Projection Monitor. Or turn on the TV POWER key on the remote control unit. Selected video signal source is not connected to input jacks, or source unit (VCR, etc.) is not turned on or is not providing a signal. Check connections and source unit operation.
COLOR IS WASHED OUT	Color value is too low. Use PICTURE/SOUND key and ADJ keys to increase COLOR value. Brightness value is too high. Use PICTURE/SOUND key and ADJ keys to reduce BRIGHT value.
COLOR TINT IS WRONG	Tint value is too high or low. Use PICTURE/SOUND key and ADJ keys to adjust TINT value.
STATIC IN TV PICTURE	Interference from motor vehicles, neon signs, etc. Try changing the height or direction of the TV antenna. Move the antenna away from the source of interference.
GHOSTING ON SCREEN	This "multipath" distortion is caused when the TV signal is received along two paths directly and after being reflected from tall buildings, mountains or other obstacles. Strong winds may have changed the direction of the TV antenna. Try changing the height or direction of the antenna. An antenna with better directional characteristics may be required.
COLORED STRIPES ON SCREEN	Interference from other radio or TV signals. Try changing the height or direction of the antenna. Try changing to a coaxial antenna cable. Coaxial cable is shielded to minimize pickup of interfering signals.
COLORED EDGES ON IMAGES	Color convergence needs adjustment. Tune in a channel, select CONVERGENCE from among the menu items and adjust by using the convergence controls on the remote control unit. (See page 16 for details.)
UNCLEAR PICTURE	Connections are loose or cables are damaged. Check connections and try using new cables. Antenna may be damaged. Check antenna.
POOR PICTURE OR COLOR QUALITY	Interference from a nearby speaker or other source of magnetism. Move source of interference away from the monitor.
NO SOUND	Rear panel SPEAKER SELECTOR is set to EXT, but external speakers are not connected. Set selector to INT.
NO ON-SCREEN CHANNEL OR OTHER DISPLAY; SLEEP TIMER DOESN'T OPERATE	Strong light striking the remote control sensor may cause the internal microcomputer to malfunction. Change the position of the Projection Monitor or the change the lighting so that the sensor is not exposed to strong light sources.

• With some VCR, when the VCR is not in play mode, the screen sometimes fluctuates. This is not a malfunction.

CARE OF YOUR PROJECTION MONITOR

DO NOT:

- Do not use strong cleansers, solvents, polishes, or chemically treated cloths to clean the screen or cabinet.
- Do not touch or scratch the screen.
- Do not fasten or place rubber or vinyl items on the monitor.
- Do not use tape on the monitor.
- Do not put any object on the monitor.

DO:

- Use a soft cloth to dust the screen and cabinet.
- If necessary, unplug the monitor and wipe with a soft cloth moistened with warm water (and mild soap if dirt has built up). Dry with a soft, dry cloth.
- Treat the screen with care to avoid scratches or damage.
- Ask your local dealer to clean the interior of the monitor if maximum picture brightness decreases. This may be caused by dust build-up inside.

